UNDERSTANDING FACTORS INFLUENCING YOUNG ORTHODONTIST CAREER DECISIONS

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A thesis submitted to the faculty at the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Master of Science in the Adams School of Dentistry (Orthodontics).

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ABSTRACT

Catherine Campbell: Understanding Factors Influencing Young Orthodontist Career Decisions
(Under the direction of Ching-Chang Ko)

Orthodontic graduates in the United States are choosing associateships over ownership as their initial employment. Less than one-third of recent graduates pursue ownership today, compared to 62% in 2010. The job market of orthodontics is being reshaped by high student debt, growth of corporate dentistry, changing gender demographics, and evolving consumer behaviors. Through qualitative interviews, and a national survey, we aim to identify factors influencing orthodontist career trajectories, and to evaluate how early career choices influence job satisfaction. Twenty-five orthodontic residents and practicing orthodontists were interviewed in a semi-structured format. Interview transcripts were analyzed to identify factors influencing career decisions and job satisfaction. Thematic patterns were established through iterative systematic analysis. To test generalizability of our qualitative results, we developed and distributed a national survey to AAO members via the Partners in Research Program. Data were assessed using descriptive and bivariate analyses. Survey response reveals increased student debt, need for income, and desire for work-life balance are influencing the decision of orthodontic residents to pursue employment options rather than ownership. Orthodontic residents maintain long-term ownership goals similar to their predecessors. Work-life balance is important to both residents and working orthodontists. The desire to spend more quality time with family friends at the cost of income is contributed to increased job satisfaction later in one's career.

ACKNOWLEDGEMENTS

Thank you to my committee members, Dr. Ko, Dr. Jacox, Dr. Lin and Mr. Mihas for your guidance and advice throughout the progress of my project. I thank Dr. Richard Steedle for his insight during the early stages of this project, and I want to acknowledge the expert guidance from Teresa Edwards as we developed our survey. Thank you to all working orthodontists and orthodontic residents who took time away from their profession, studies, and families to participate as interviewees and survey respondents for this project. We thank you for your openness, thoughtfulness and honesty in answering our study questions, and we appreciate your time and insight. Your time and dedication to furthering research efforts in the field of orthodontists is commendable. We are proud to present data dispelling the myth that practice ownership is on the decline due to the rise of women in dentistry. Instead, as educators, we should reflect on the impact of crushing educational debt on our trainees.

A very special thank you to my family and fiancé, Arthur Worthington, for their constant support and encouragement during my lengthy educational pursuits in the field of dentistry. Without them, my educational journey would not have been possible.

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LIST OF ABBREVIATIONS

AAO	American Association of Orthodontics
AAOF	American Association of Orthodontists Foundation
ASOD	Adams School of Dentistry
DSS	Dentist Satisfaction Survey
DSO	Dental Support Organization
e.g.	exempli gratia
Fig	Figure
HSDM	Harvard School of Dental Medicine
IRB	Institutional Review Board
LLC	Limited Liability Company
PRP	Partners in Research Program
SAO	Southern Association of Orthodontists
UNC	University of North Carolina
UPSDM	University of Pennsylvania School of Dental Medicine
US	United States

LIST OF SYMBOLS

©	Copyright Symbol
®	Registered Trademark

REVIEW OF THE LITERATURE

Orthodontic residents face a common question: What comes after graduation? The answer is intimately tied to current trends in orthodontics including increased educational debt, a rising number of orthodontic graduates, shifts in dentist demographics, intensified marketplace competition, direct-to-consumer products, and growth of corporate dentistry with lucrative employment options. Identifying how these factors influence career decisions as well as financial and job satisfaction outcomes is important for understanding career moves of today's graduating and early career orthodontists.

Marketplace Trends

Since 2001, eleven additional orthodontic residency programs have opened, increasing the number of graduates entering the marketplace annually by 31%, from 282 in 2001 to 370 in 2017 (Fig 1.1)[1,2]. Orthodontists cite increasing numbers of orthodontic specialists and general dentists providing orthodontic care as a cause of decreased practice growth[3]. Simultaneously, more orthodontists are working in large consolidated, multi-specialty practices, including corporate dental support organizations (DSO)[4,5]. Today's graduates, who are primarily millennials born after 1982, enter the workforce with greater competition for jobs and sizable debt burdens; they are choosing to enter large corporate or interdisciplinary practices during their first five years of practice instead of immediate ownership[1].

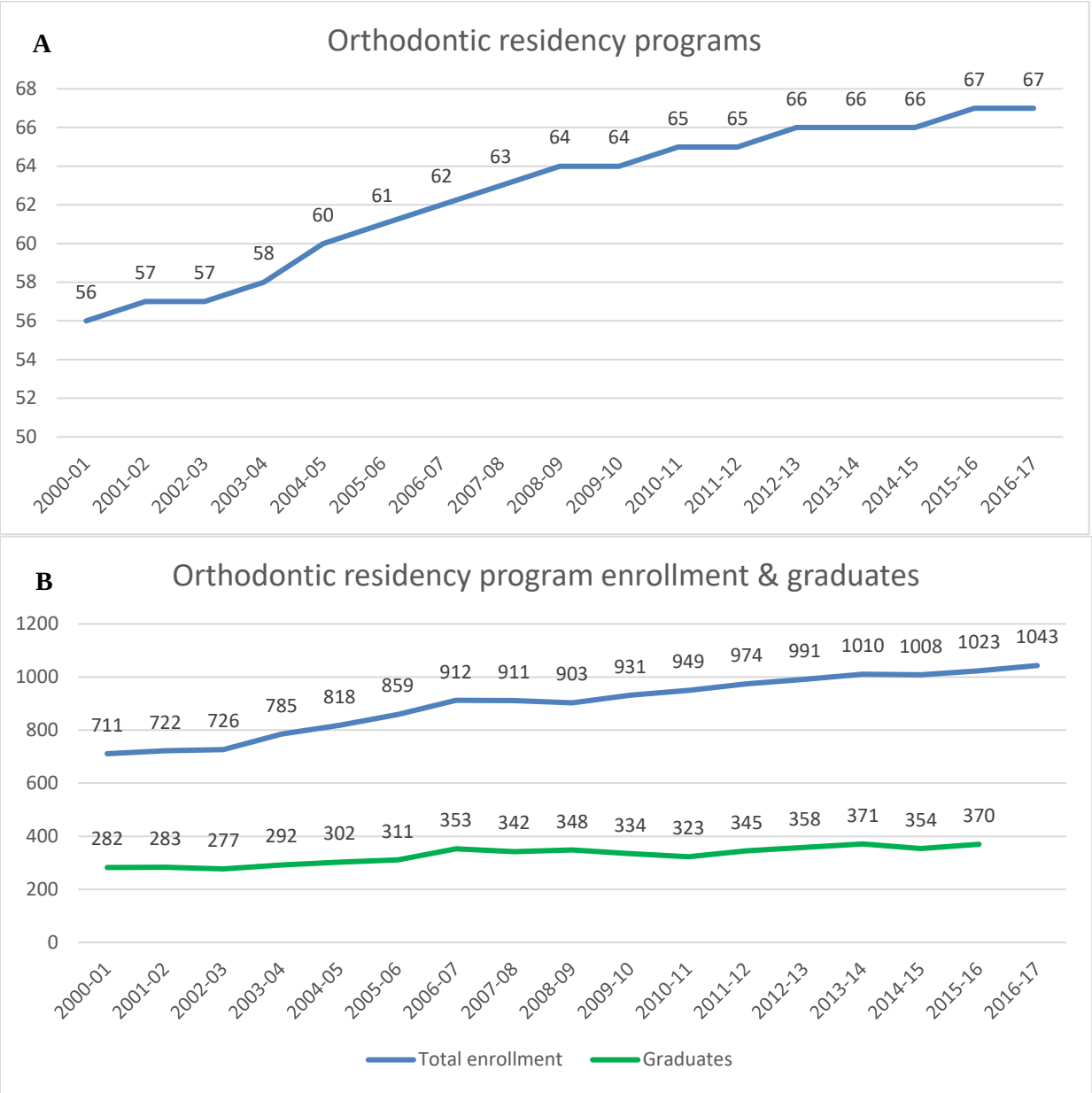
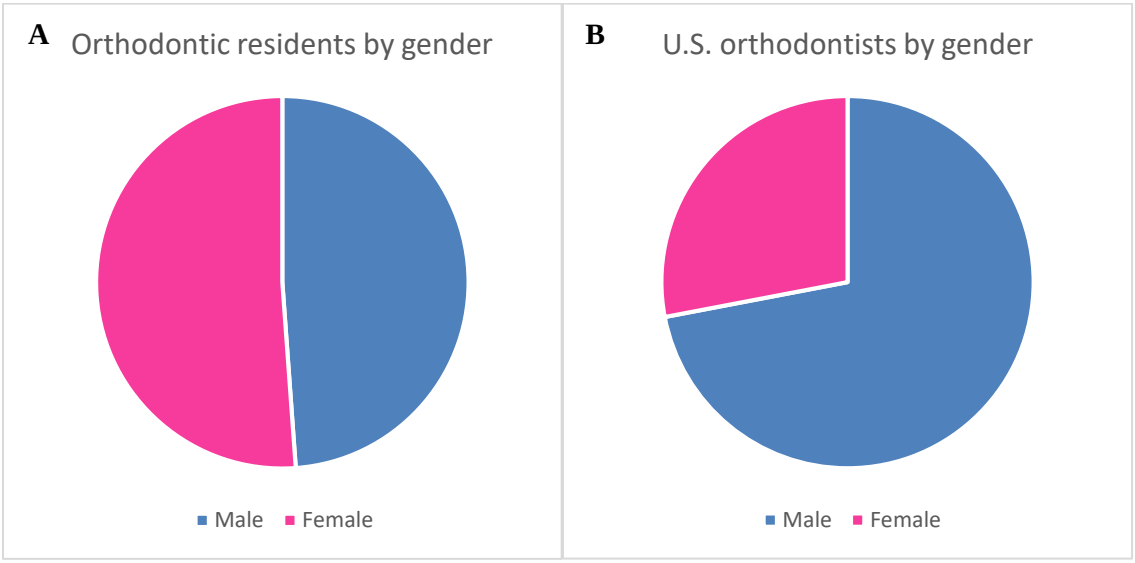


Figure 1.1: Increase in orthodontic graduates. **A.** Since 2001, the number of accredited orthodontic programs in the United States has increased from 56 to 67 by the year 2017. **B.** Total enrollment of orthodontic residents and total number of orthodontic graduates has increased from 711 in 2001 to 1043 in 2017, and 282 in 2001 to 370 in 2017, respectively[1,2].

Changing Demographics

Another influential shift is the ever-increasing rise in women doctors within dentistry and orthodontics, with a possible redefining of professional commitment to family responsibilities. The 2018 Bentson, Copple and Associates, LLC Annual Orthodontic Resident survey shows a

10% increase in female survey participants from 2010 to 2018 to 48% with male participation dropping from 62% to 52% over the same time period[6]. This is reflective of the 2018-2019 orthodontic resident demographic data reported from the United States. Last year there were a total of 1,080 orthodontic residents enrolled in orthodontic residency programs with a breakdown of 527 or 48.8% males and 552 or 51.1% females. It is only recently that this shift changes to favor males over females reflecting a demographic change that will continue to favor females in years to come[1]. In 2018, there were equal number of male and female orthodontists under the age of 35 years in the United States (Fig 1.2). Women orthodontists report that achieving work-family balance is important, and they pursue associateships for improved practice structure and professional support[7]. Exploring shifts in previously male-dominated fields and the rise of dual-income couples may provide insight to decision making trends of younger doctors.



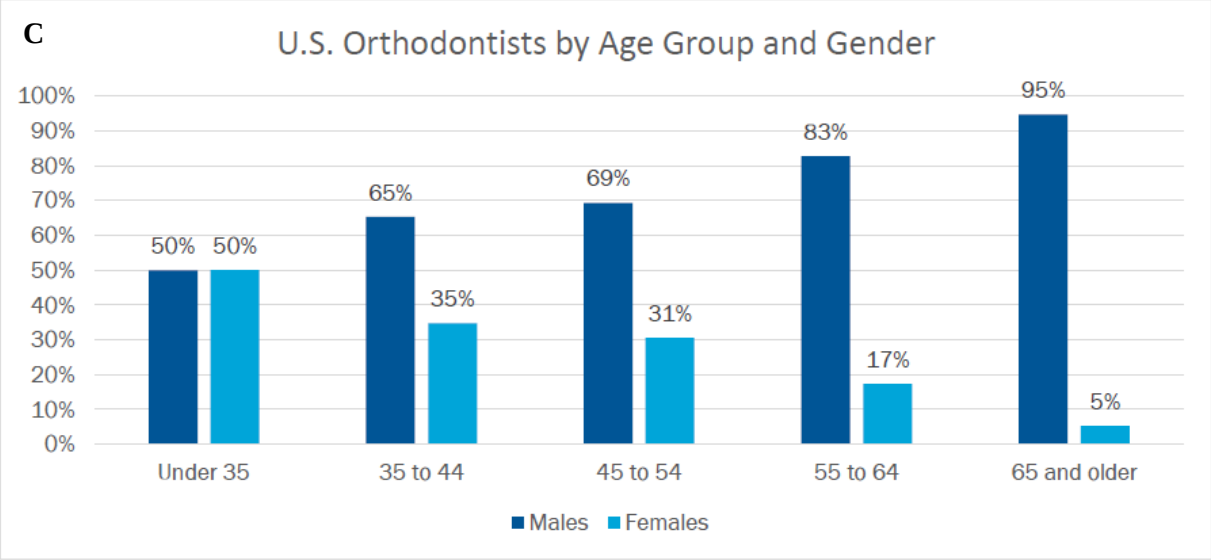


Figure 1.2: Orthodontists by gender. **A.** Over half of orthodontic residents enrolled in accredited orthodontic residency programs in the United States are female[1]. **B.** As of 2018, females make up only 72% of actively practicing orthodontists in the United States[7]. **C.** In 2018, practicing orthodontists under the age of 35 were equally split between males and females[7].

Debt Responsibility

Anecdotal evidence suggests that increased debt responsibility of graduating orthodontists has influenced the selection of career paths[8,9]. In the early 2000's, data first suggested a role for increased debt in job choice, as average burden grew to $130,000[8,10,11]. Debt has ballooned with 43% of students bearing $0 to $199,999, 42% owing $200,000 to $399,999, and 15% carrying $400,000 or more in 2010. The numbers continue to rise; the latest 2018 results show a greater than twofold increase (15% to 38%) of orthodontic graduates assuming debt burdens of greater than $400,000[6]. The national average debt of dental school graduates is $262,119 (Fig 1.3). Increased debt is reflected in graduate orthodontic tuition inflation combined with fewer programs offering stipends and fellowships[12]. In addition to influencing career path, debt burden among new orthodontists is delaying financial lifestyle decisions such as purchasing a home or saving for retirement[13].

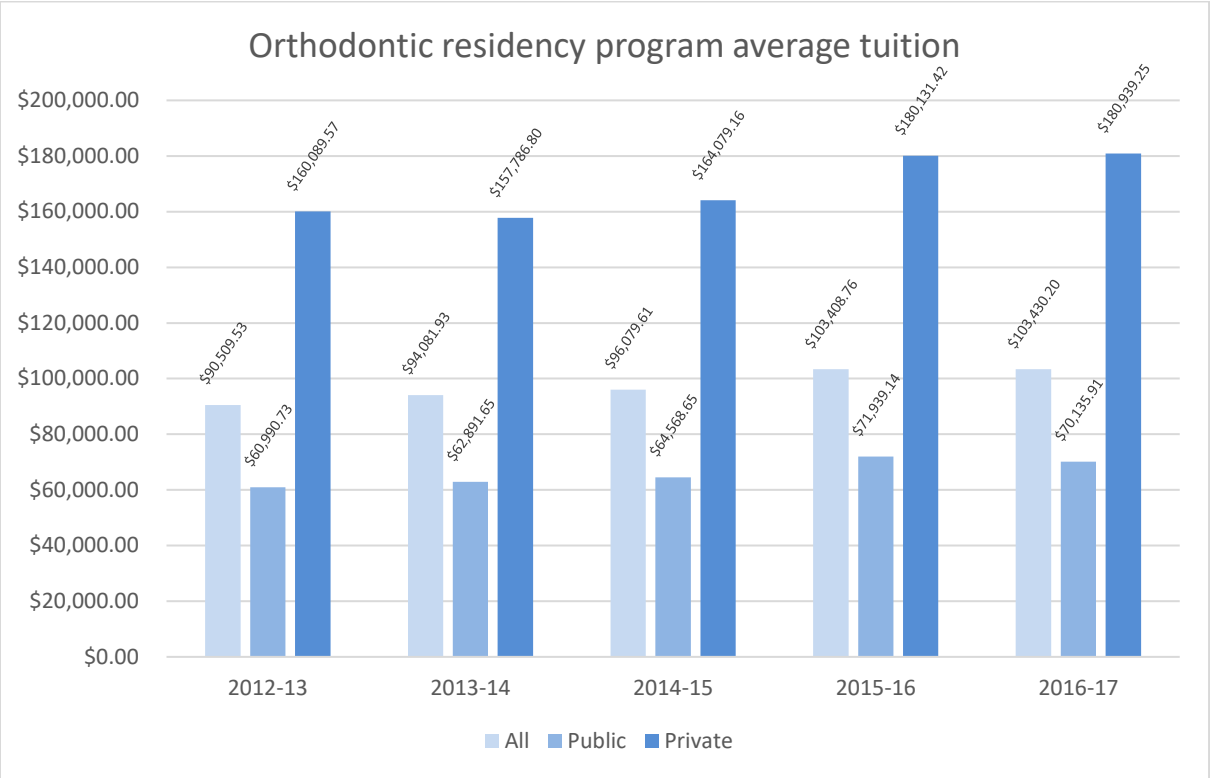


Figure 1.3: Increase in cost of orthodontic education. Orthodontic residency program tuition continues to rise saddling students with staggering debt responsibility.

Career Options

Data from 2014 and 2016 shows that the number of available orthodontic practices for sale or partnership opportunities has decreased by 21.7% from 161 to 126 with the number of associate or independent contractor positions increasing by the same percentage, 21.7%, from 240 to 292 (Fig 1.4)[14]. Additional data reports that within the orthodontic community, fewer orthodontists under the age of 35 are pursuing ownership paths (Fig 1.5). With that, 78% of graduating residents indicated that their initial career plan post-residency is employment as a full-time private practice associate with 55% indicating they will initially work as a part-time private practice associate[1]. Despite these marketplace challenges, the specialty of orthodontics remains a desirable career path among graduating dental students.

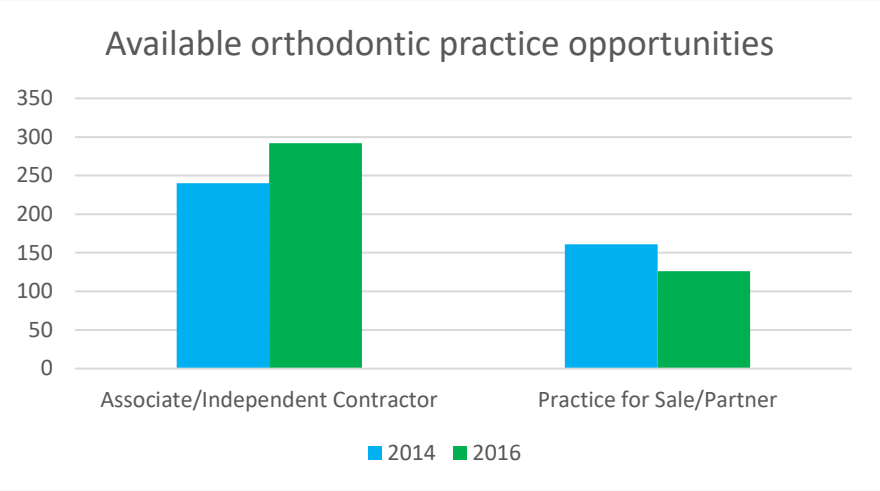


Figure 1.4: Decrease in orthodontic ownership opportunities. Fewer ownership (solo or partner) opportunities are available to graduating orthodontic residents. Employment opportunities (associate/independent contractor) are on the rise.

A								
	2005	84.2%		2005	66.8%		2005	88.7%
	2017	77.5%		2017	63.4%		2017	84.1%

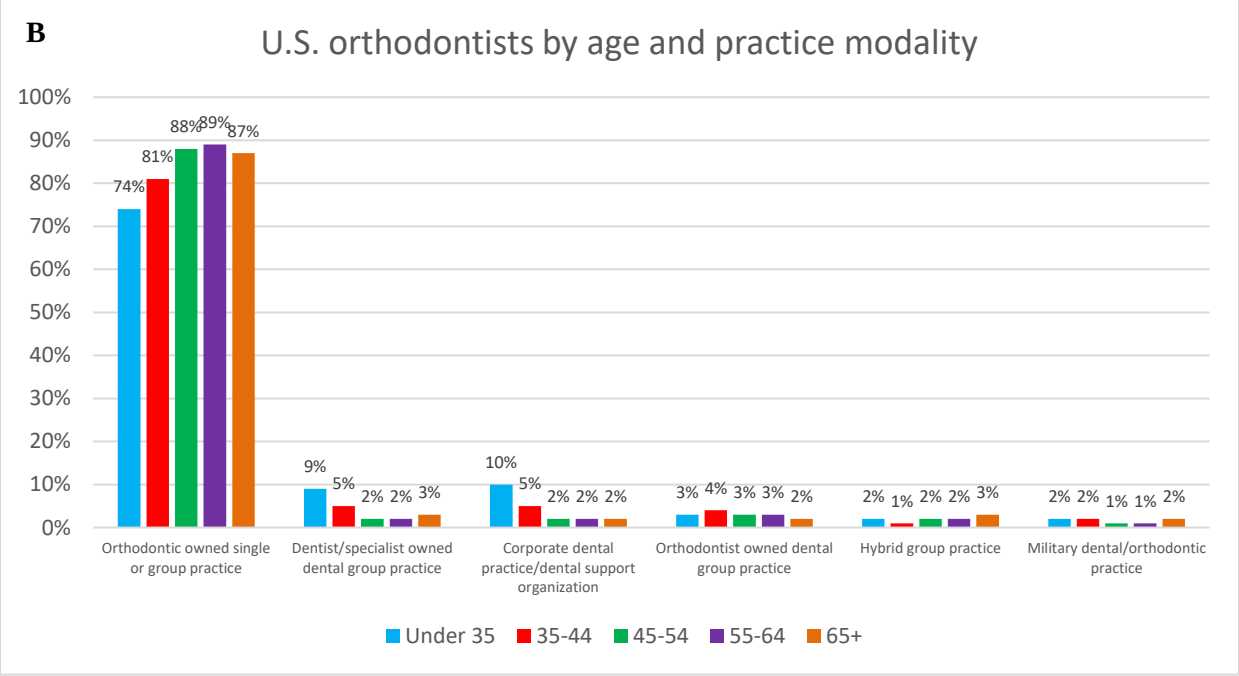


Figure 1.5: Decrease in younger dentists pursuing ownership. **A.** Both male and female dentists are pursuing initial ownership less than their predecessors. **B.** Fewer orthodontists under the age of 35 are pursuing ownership with increased interest in associate and corporate opportunities.

Job Satisfaction

Among dental school graduates, the orthodontic profession is highly regarded for quality of life and self-employment potential[13]. Limited studies have been published on job satisfaction of orthodontists. Published data from 2002, using the validated Dentist Satisfaction Survey (DSS), revealed high job satisfaction among orthodontists who cited quality of life as a primary factor. Interactions with patients, staff, and colleagues along with overall respect also contributed to satisfaction. Dissatisfaction in the profession was linked to decreases in practice income, as well as lack of practice management knowledge[15,16]. Applying similar job satisfaction methodology to current orthodontic residents, early-career and established orthodontists will provide information on shifts in career trajectory and satisfaction as it relates to years after residency.

Conclusions

To understand trends in orthodontics and to advise residents on career choices, this study aims to explore the impact of debt, marketplace competition and changing demographics on job decisions while determining whether the risk of early ownership pays dividends later.

REFERENCES

1. 2017 Orthodontic Workforce Report. American Association of Orthodontists.

2. Waldman HB, Perlman SP, Schindel R. Update on the imbalanced distribution of orthodontists, 1995-2006. *Am J Orthod Dentofac Orthop*. 2009;135(6):704-708. doi:10.1016/j.ajodo.2009.01.004

3. Keim RG, Gottlieb E, Vogels DS, Vogels PB. 2015 JCO Orthodontic Practice Study: Part 3 Practice Growth and Staff Data. *J Clin Orthod*. 2015;53(12):745-756.

4. Roberts CA. The case for dental support organizations. *Am J Orthod Dentofac Orthop*. 2017;151(2):245-247. doi:10.1016/j.ajodo.2016.11.018

5. Vujicic M, Israelson H, Antoon J, Kiesling R, Paumier T, Zust M. A profession in transition. *J Am Dent Assoc*. 2014;145(2):118-121. doi:10.14219/jada.2013.40

6. 2018 Annual Orthodontic Resident Survey. Bentson Copple & Associates.

7. Davidson S, Major P, Flores-Mir C, Amin M, Keenan L. Women in orthodontics and work-family balance: challenges and strategies. *J Can Dent Assoc*. 2012;78(c61):1-6.

8. Lindauer SJ, Peck SL, Tufekci E, Coffey T, Best AM, Richmond E. The crisis in orthodontic education: Goals and perceptions. *Am J Orthod Dentofac Orthop*. 2003;124(5):480-487. doi:10.1067/j.ajodo.2003.08.007

9. Anning RJ, Thomson WM, Quick AN. Orthodontic education programs: An international comparison of students' views and experiences. *Am J Orthod Dentofac Orthop*. 2011;139(2):220-227. doi:10.1016/j.ajodo.2010.01.032

10. Bruner MK, Hilgers KK, Silveira AM, Butters JM. Graduate orthodontic education: The residents' perspective. *Am J Orthod Dentofac Orthop*. 2005;128(3):277-282. doi:10.1016/j.ajodo.2005.04.031

11. Noble J, Hechter FJ, Karaiskos NE, Lekic N, Wiltshire WA. Future practice plans of orthodontic residents in the United States. *Am J Orthod Dentofac Orthop*. 2009;135(3):357-360. doi:10.1016/j.ajodo.2008.09.024

12. Keim R. The Burden of Student Debt. *J Clin Orthod*. 2016;L(1):9-10. www.jco-online.com.

13. Pruzansky DP, Ellis B, Park JH. Influence of Student-Loan Debt on Orthodontic Residents and Recent Graduates. *J Clin Orthod*. 2016;L(1):23-32.

14. AAO White Paper: You Have Options - Orthodontic Career Considerations for Residents and Graduates. American Association of Orthodontists.

15. Shugars DA, Hays RD, Dimatteo MR, Cretin S. Development of an Instrument to Measure Job Satisfaction among Dentists. *Med Care*. 1991;29(8):728-744.

16. Roth SF, Heo G, Varnhagen C, Glover KE, Major PW. Job satisfaction among Canadian orthodontists. *Am J Orthod Dentofac Orthop*. 2003;123(6):695-700. doi:10.1016/S0889-5406(03)00200-2

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Introduction

Orthodontic residents face a common question: What comes after graduation? The answer is intimately tied to current trends in orthodontics including increased educational debt, a rising number of orthodontic graduates, shifts in dentist demographics, intensified marketplace competition, direct-to-consumer products, and growth of corporate dentistry with lucrative employment options. Identifying how these factors influence career decisions as well as financial and job satisfaction outcomes is important for understanding career moves of today's graduating and early career orthodontists.

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increasing by the same percentage, 21.7%, from 240 to 292[14]. Additional data reports that within the orthodontic community, fewer orthodontists under the age of 35 are pursuing ownership paths. With that, 78% of graduating residents indicated that their initial career plan post-residency is employment as a full-time private practice associate with 55% indicating they will initially work as a part-time private practice associate[1]. Despite these marketplace challenges, the specialty of orthodontics remains a desirable career path among graduating dental students.

Another influential shift is the ever-increasing rise in women doctors within dentistry and orthodontics, with a possible redefining of professional commitment to family responsibilities. The 2018 Bentson, Copple and Associates, LLC Annual Orthodontic Resident survey shows a 10% increase in female survey participants from 2010 to 2018 to 48% with male participation dropping from 62% to 52% over the same time period[6]. This is reflective of the 2018-2019 orthodontic resident demographic data reported from the United States. Last year there were a total of 1,080 orthodontic residents enrolled in orthodontic residency programs with a breakdown of 527 or 48.8% males and 552 or 51.1% females. It is only recently that this shift changes to favor males over females reflecting a demographic change that will continue to favor females in years to come[1]. In 2018, there were equal number of male and female orthodontists under the age of 35 years in the United States. Women orthodontists report that achieving work-family balance is important, and they pursue associateships for improved practice structure and professional support[7]. Exploring shifts in previously male-dominated fields and the rise of dual-income couples may provide insight to decision making trends of younger doctors.

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To understand trends in orthodontics and to advise residents on future career choices, we conducted a mixed-methods study to collect qualitative interview and quantitative survey data exploring the impact of debt, marketplace competition and family responsibilities on job decisions and career satisfaction, while determining whether the risks and demands of early ownership pay dividends later. Questions were focused on identifying factors important to orthodontists at different career stages in deciding between ownership and employment, and collecting data on how these career choices influence income potential and job satisfaction years later.

Materials and Methods

Interview Sample

Twenty-five orthodontists (15 privately practicing orthodontists and 10 orthodontic residents) were enrolled in this qualitative study to participate in semi-structured, one-on-one interviews following a topic guide[17–19]. All interviewees were invited for participation in semi-structured, one-on-one interviews following a topic guide. Qualitative research through semi-structed interviewing creates an inviting environment for participants to articulate answers to key

questions while elaborating on views important to that individual[17–19]. In addition, this method of study allows for deeper analysis of topics that are particularly important to the interviewee. The flexibility of this approach invites exploration of factors and perspectives unexplored in our original hypothesis[18,19]. Iterative and systematic analysis reveals thematic patterns valuable for qualitative data collection with validity ensured by researcher triangulation[17–20].

Interview Sample Recruitment

Between June 2018 and December 2018, orthodontists in North Carolina, Pennsylvania and Massachusetts were contacted for participation in our study. All contacted resident and practicing orthodontists are in our professional network or affiliated as adjunct faculty with UNC Adams School of Dentistry (ASOD), University of Pennsylvania School of Dental Medicine (UPSDM) or Harvard School of Dental Medicine (HSDM). Each resident or practicing orthodontist was approached in person at the UNC ASOD, UPSDM and HSDM graduate orthodontic clinics or contacted via email by the authors. Study information and consent forms were reviewed and signed by potential participants. Resident and practicing orthodontists were screened for inclusion and exclusion criteria (Table 1.1)[17–19]. Participants were sent a description of the study with consent and demographic forms to return prior to the interview. Ethics approval was given by the IRB board of UNC School of Dentistry (IRB# 16-2743).

Table 1.1: Qualitative inclusion and exclusion criteria

	Criteria
Inclusion	• Orthodontic resident in their final year of residency (2nd or 3rd depending on program length) or within 6 mo of graduating. • Orthodontist who practices primarily in a private clinic or for a corporate/DSO office that is either orthodontics-only or group multi-specialty. • Orthodontist must be an independent contractor, associate, partner or sole owner of the practice in which they work.

	• Doctor must have practice experience ranging from 6 mo to 10 years post-graduation from residency. • Orthodontist must provide informed consent.
Exclusion	• Orthodontic resident not in their final year of residency (1st and/or 2nd depending on program length). • Doctor who does not practice privately (for example, academic-only or military orthodontists). • An orthodontist who has been practicing privately for less than 2 years.

Interview Methodology

One-on-one interviews between the primary author and research participants were conducted remotely via phone (19 out of 25 interviews) or in-person (6 out of 25 interviews) and lasted 45-70 minutes. Each interview was semi-structured through use of a topic guide that facilitated in-depth responses (Appendix 1). The topic guide includes questions on initial and current career choices in orthodontics, factors important to initial employment as well as those important to transitioning within the field, personal and observed impacts of student debt, influences of marital status and family responsibilities on career choice and factors positively and negatively impacting overall job satisfaction. The finalized topic guide was developed through an extensive literature review of orthodontic workforce data, followed by revisions after pilot interviews conducted with several orthodontists. Our qualitative research collaborator guided the topic guide development and refinement process[17–19].

Interview Sample Demographics

Twenty-five qualifying participants were selected via purposeful sampling to include ten orthodontic residents, ten early career orthodontists and five mid-career orthodontists. We interviewed residents in the final year of their residency program, who were in the process of securing jobs. We included one participant who had been working for less than three months

after graduation. Early career orthodontists were defined as those who had been working for more than six months through their fifth year of practice since graduating residency. Mid-career orthodontists were defined as those who were in their sixth year to tenth years of practice. For the purposes of this study, we categorized the three major job types as private practice ownership, encompassing both solo ownership and partnership, private practice associateship, including independent contractors, and Mega-Practice employment, including corporate practices, Dental Support Organizations (DSOs) or group practices with six or more offices. Our sample includes interviewees from North Carolina, Pennsylvania and Massachusetts, who attended various dental schools and residency programs with a range of educational debt burdens. Demographic data was collected on participant's age, gender, marital/relationship status, income, debt burden, types of jobs, and residency programs; demographics can be found in Table 1.2. All information was self-reported.

Table 1.2: Interview sample demographics

	Orthodontic Resident (n=10)	Early Career Orthodontist (n=10)	Mid-Career Orthodontist (n=5)
Age (years)	30.8 ± 3.49	33 ± 2.79	39 ± 1.67
Gender	7 Female, 3 Male	4 Female, 6 Male	2 Female, 3 Male
Residency Program	Eastman (1), Harvard (1), Louisville (1), Penn (1), Tufts (1), UNC (5)	Harvard (1), UNC (8), VCU (1)	BU (1), UNC (4)
Initial employment	3 Ownership 3 Private Practice Associateship 4 Corporate/DSO	1 Ownership 6 Private Practice Associateship 3 Corporate/DSO	2 Ownership 2 Private Practice Associateship 1 Corporate/DSO
Current Employment		6 Ownership 4 Private Practice Associateship 1 Corporate/DSO	5 Ownership 0 Private Practice Associateship 0 Corporate/DSO

Initial Debt (mean)	$278,500 ± 211,499	$274,200 ± 174,887	$228,000 ± 260,645
Initial Debt (range)	$0 - $660,000	$0 - $600,000	$0 - $700,000
Current Debt (mean)		$186,500 ± 135,485	$149,600 ± 227,790
Current Debt (range)		$0 - $330,000	$0 - $600,000
Initial Income (mean)	$202,200 ± 62,765	$173,280 ± 42,144	$135,600 ± 33,856
Current Income (mean)		$165,540 ± 85,438	$283,200 ± 124,152
# Jobs		1.5 ± 0.67	2.8 ± 2.40

Qualitative Data Analysis

Interviews were audio recorded using a transcription device, transcribed and de-identified to anonymize participants. Transcripts were qualitatively analyzed using MAXQDA12® software. A codebook with definitions was generated after analyzing 5 transcripts; this codebook was further revised after multiple consensus-coding meetings with our qualitative collaborator (Appendix 2). The code list includes deductive codes (e.g., attitudes, values, decision making, stressors) and inductive codes (e.g.,specific career paths, debt burden, autonomy)[21]. Data analysis of frequency calculations and code co-occurrences was accomplished through the use of MAXQDA12® software[22]. Data consolidation was executed through designation and assignment of codes along with demographic discernment. Co-occurrence maps were generated to explore interviewee responses allowing multidimensional exploration of factors coded to more than one topic during the conversation. This method of analysis allows the researcher to capture shared meaning in interviewee narratives. For example, co-occurrence mapping illustrates the

overlapping of a certain belief with a corresponding decision therefore accounting for two co-occurring codes[22]. Representative quotes from an assigned code or demographic category were analyzed by the first three authors independently to identify factors important to orthodontists when making career decisions as well as factors influencing job satisfaction[21]. As key themes emerged, authors revised and rechecked against data ensuring accuracy. Quotations were identified and selected through collaboration by all three authors as representation of code and demographic categories.

Survey Development

The second part of this two-phase mixed methods investigation consisted of two surveys developed from the qualitative interviews that identified factors important to orthodontic residents and working orthodontists when considering career choices. For example, we learned in qualitative interviews that income, autonomy and commute are important factors when choosing a job, and therefore, were incorporated into the quantitative survey. Ultimately, these surveys measured generalizability of our findings after randomized distribution to membership of the American Association of Orthodontists (AAO)[12].

Due to a lack of validated questions available for this topic, published questionnaires were referenced and questions were developed from our qualitative findings by the authors with significant input from a sociologist working in education (Paul Mihas), an expert in survey development (Teresa Edwards), a biostatistician (Dr. Feng-Chang Lin), and orthodontic faculty members (Dr. Ching-Chang Ko & Dr. Laura Jacox) to ensure representation of different viewpoints[3,23]. The resident survey was fully pre-tested with probe questions by 5 orthodontic residents and 2 academic orthodontic faculty at UNC Adams School of Dentistry. The working orthodontist survey was fully pre-tested with probe questions by 5 privately practicing doctors

and 2 academic orthodontic faculty at the UNC Adams School of Dentistry. Probes were used to explore question interpretation and to identify points of ambiguity. The survey was iteratively revised based on feedback to improve clarity.

Both orthodontic resident and working orthodontist surveys consist of the same 11 demographic questions about the individual. The first 11 questions are identical across both surveys, but later questions are customized using a pre-programed decision tree in Qualtrics to display questions based on whether the individual is considering an initial career or a career transition. The orthodontic resident survey has a total of 50 questions and the working orthodontist survey has a total of 71 questions. Each participant did not answer all questions due to the pre-programmed decision tree and instead the final survey reflects a customized experienced based on type of career and number of career transitions.

Survey Sample Recruitment and Distribution

The working orthodontist survey and orthodontic resident survey were submitted to the American Association of Orthodontists (AAO) Partners in Research Program (PRP) for review and approval. Once approved, the AAO randomly selected 2,281 active members listed as practicing orthodontists with registered email addresses to be contacted with informed consent documentation and a Qualtrics link for the working orthodontist survey participation. In addition, the AAO sent the Qualtrics link for the orthodontic resident survey along with informed consent documentation to all active student members totaling 1,318 recipients. Recipients were randomly selected from their total membership, after non-qualifying members were excluded (Table 2.1). Our sample of working orthodontists includes actively practicing doctors in private or corporate clinics in the United States and Canada, excluding all current residents and retired doctors (Table 2.1). Our sample of orthodontic residents includes all residents registered with the AAO in their

first, second or third years of residency in the United States and Canada, excluding actively practicing doctors or retired orthodontists (Table 1.3). Screening questions ensured all participants met inclusion criteria. Orthodontic residents and working orthodontists who did not fill out the survey within three weeks, received a second email, distributed at a different time and day to maximize responses. Amazon gift card incentives were offered to all survey respondents. The survey was conducted through the UNC Qualtrics account and data was stored securely and de-identified.

After an initial distribution and reminder email for the working orthodontist survey, the AAO authorized an additional random distribution to 1,160 actively practicing orthodontists in the Midwest, Southeast and Pacific Coast, that had not been previously emailed, to boost responses and enrich data, allowing for regional comparisons. Therefore, a total of 3,441 working orthodontists listed as AAO members were randomly selected and emailed in both distribution waves, with a total combined response rate of 9.97% and n=343. A total of 1,318 orthodontic residents listed as active AAO members were randomly selected and emailed with a total combined response rate of 14.03% response rate and n=185.

Table 1.3: Quantitative inclusion and exclusion criteria

	Criteria
Inclusion	• Resident currently enrolled in an accredited orthodontic program in the United States or Canada. • Resident is an active member of the AAO. • Actively practicing orthodontist in United States or Canada. • Actively practicing orthodontist is a member of the AAO.
Exclusion	• Retired orthodontists

Survey Data Analysis

Survey data were assessed using descriptive and bivariate analyses. Descriptive statistics such as mean, standard deviation and percentage are reported for collected variables. Bivariate association analysis between demographic variables and questions (scales) were explored using t-tests and chi-squared tests when appropriate. Responses with continuous variables were analyzed using two-sample t-tests for pairwise comparisons. Categorical data was assessed using the chi-square test. Multiple-choice questions where respondents could choose up to 2 answers or as many options as desired are reported as frequencies with chi-square test pairwise comparisons.

When all data is collected following the final AAO distribution, final analyses will be weighted by inverse probability weights that balance the sample to represent the whole population. Our data will indicate the frequency and distribution of various career decisions of residents and working orthodontists nationwide and regionally, and identify factors important to these career decisions as well as those that influence overall job satisfaction in the field.

Survey Sample Demographics

Survey data of both orthodontic residents and working orthodontists is generalizable to the United States with well-distributed regional response data. Survey participant demographics include participant's age, gender, marital/relationship status, income, debt burden, types of jobs, and residency programs (Table 1.4). In addition, data is collected on working orthodontists' current employment (Table 1.5) and initial employment (Table 1.6). Data was also collected on expected initial employment for orthodontic residents (Table 1.7). All information was self-reported.

Table 1.4: Survey Sample Demographics

	Orthodontic Resident (n=185)	**Working Orthodontist (n=343)**
Age in years (mean)	30.36 (n=176)	50.55 years (n=338)
Age in years (range)	25 to 52	29 to 81
Gender	42.6% Female (n=75) 57.4% Male (n=101)	30.3% Female (n=102) 69.7% Male (n=235)
Contribution to Income	39.47% (n=132)	84.37% (n=306)
Marital Status	47% Married (n=83) 53% Single* (n=92) *54% in a committed relationship (n=50)	85% married (n=286) 15% Single* (n=51) *41% in a committed relationship (n=21)
Residency Graduation	38.6% (n=71) 2020 61.4% (n=113) 2021 - 2022	20.7% (n=50) 2010 - 2019 20.7% (n=50) 2000 - 2009 20.7% (n=50) 1990 - 1999 37.8% (n=91) 1989 or before
Initial Debt (mean)		All: $194,337 ± 192,315 Male: $179,788 ± 184,027 Female: $226,204 ± 207,616 p-value = 0.045
Current Debt (mean)	All: $302,180 ± 246,271 Male: $296,939 ± 250,701 Female: $309,122 ± 241,803 p-value = 0.749	All: $69,756 ± 155,176 Male: $53,856 ± 142,370 Female: $105,449 ± 177,494 p-value = 0.013
Initial/Expected Initial Annual Income (mean)	All: $222,529 ± 68,380 Male: $231,378 ± 76,935 Female: $210,811 ± 53,328 p-value = 0.040	All: $173,845 ± 121,712 Male: $167,524 ± 115,085 Female: $186,207 ± 134,190 p-value = 0.207
Current Annual Income (mean)		All: $393,006 ± 203,441

		Male: $429,263 ± 202,564 Female: $310,215 ± 181,076 p-value = <0.001

Table 1.5: Working orthodontist current employment

Current employment	All	Male	Female	P-value
Sole private practice owner	60% (n=207)	62% (n=145)	60% (n=61)	0.808
Partnership private practice owner	19% (n=66)	22% (n=51)	15% (n=15)	0.178
Corporate and/or dental support organization (DSO) associate	8% (n=28)	7% (n=16)	11% (n=11)	0.274
Private practice associate	9% (n=32)	6% (n=15)	16% (n=16)	0.012
Independent contractor	6% (n=22)	7% (n=16)	5% (n=5)	0.628
Military orthodontist	0.2% (n=1)	0.4% (n=1)	0% (n=0)	1.00
Public health orthodontist	0.2% (n=1)	0 (0)	1% (n=1)	0.303
Academic orthodontist	8% (n=27)	21 (9)	6% (n=6)	0.391
Hospital orthodontist	2% (n=8)	4 (2)	4% (n=4)	0.250
Other	3% (n=12)	7 (3)	5% (n=5)	0.359

*****Survey participants asked to select all practice modalities that apply.

Table 1.6: Working orthodontist initial employment

Initial employment	All	Male	Female	P-value
Sole private practice owner	27% (n=91)	31% (n=74)	17% (n=17)	0.005
Partnership private practice owner	7% (n=23)	8% (n=18)	5% (n=5)	0.482
Corporate and/or dental support organization (DSO) associate	12% (n=42)	10% (n=23)	18% (n=18)	0.048

Private practice associate	43% (n=147)	43% (n=101)	46% (n=46)	0.722
Independent contractor	12% (n=41)	11% (n=26)	15% (n=15)	0.367
Military orthodontist	4% (n=15)	6% (n=15)	0% (n=0)	0.007
Public health orthodontist	1% (n=2)	1% (n=2)	0% (n=0)	1.00
Academic orthodontist	9% (n=29)	9% (n=22)	7% (n=7)	0.531
Hospital orthodontist	3% (n=9)	2% (n=4)	5% (n=5)	0.136
Other	1% (n=3)	1% (n=3)	0% (n=0)	0.556

*****Survey participants asked to select all practice modalities that apply.

Table 1.7: Orthodontic resident expected initial employment

Expected initial employment	**All**	**Male**	**Female**	**P-value**
Sole private practice owner	16% (n=29)	25% (n=25)	5% (n=4)	<0.001
Partnership private practice owner	21% (n=39)	24% (n=24)	20% (n=15)	0.587
Corporate and/or dental support organization (DSO) associate	36% (n=66)	38% (n=38)	37% (n=28)	1.00
Private practice associate	65% (n=121)	63% (n=64)	76% (n=57)	0.100
Independent contractor	14% (n=26)	17% (n=17)	12% (n=9)	0.400
Military orthodontist	2% (n=4)	4% (n=4)	0% (n=0)	0.137
Public health orthodontist	2% (n=4)	2% (n=2)	3% (n=2)	1.00
Academic orthodontist	5% (n=10)	1% (n=1)	12% (n=9)	0.002
Hospital orthodontist	2% (n=3)	0% (n=0)	4% (n=3)	0.076
Other	1% (n=2)	1% (n=1)	1% (n=1)	1.00

*****Survey participants asked to select all practice modalities that apply.

Results

Factors Influencing Initial Job Decisions

To understand how doctors make career decisions, we explored factors important to orthodontic residents, early career and mid-career orthodontists when they decided on their initial job following graduation. Early and mid-career orthodontists were asked to reflect on their first job choices and factors important to them when making that decision. Though subject to recall bias, there were some notable differences in how older doctors considered career options compared to today's graduates.

Debt was a primary influencer for nearly all residents and most early career orthodontists when selecting their first job, in contrast to mid-career doctors where debt was a minor consideration. Our resident and early-phase doctor sample included a wide range of debt burdens (Table 1.2). All residents discussed the stress of educational debt and how it has shaped their career choices. Residents with no debt felt grateful to be free from this financial obligation, and stated that they were more willing to buy a practice or to start their own office due to their freedom from loans. Likewise, married individuals sharing their debt load with a working spouse were also more open to practice loans compared with those who face debt repayment on their own.

"I think it's [debt] really impacting people. Without my husband, there's no way I would all of a sudden take on more [debt] for a practice. I would have to associate."-Resident

The overwhelming majority of residents, regardless of marital status or gender, remarked on the concerning rise of educational debt in orthodontics. Income was the most important factor for residents when choosing their initial career (Fig 2.1). This was seen for both genders and was mentioned frequently when discussing initial career. Residents also considered ownership

potential, quality of patient care and work-life balance when deciding on their first job after residency. There were no major differences between genders but female residents did place more importance on delivery of care when choosing their initial position.

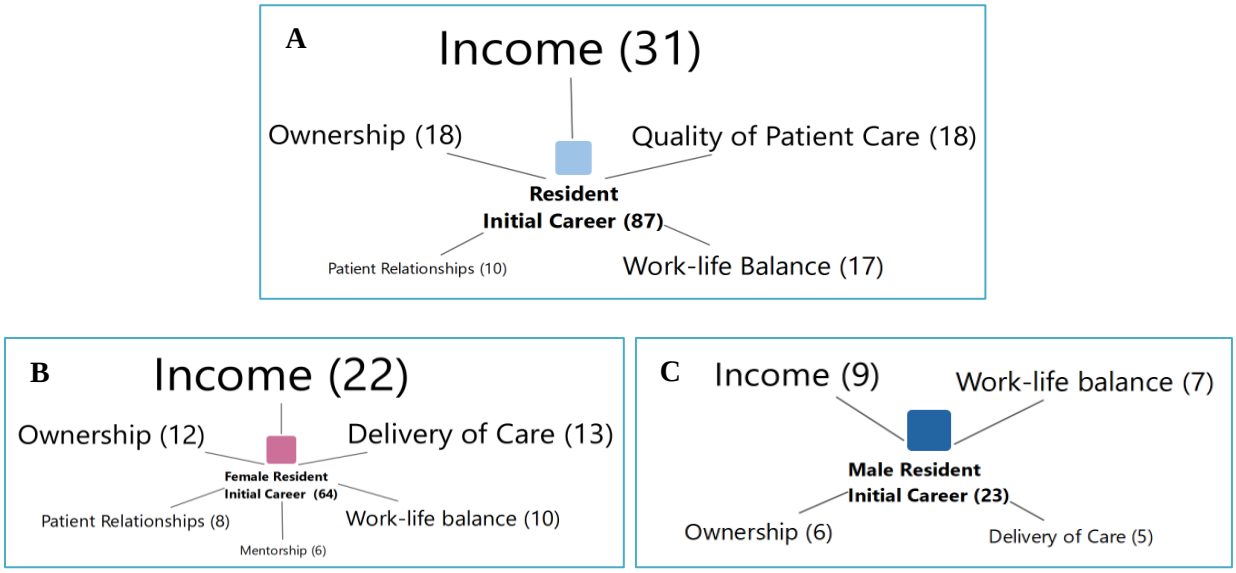

Figure 2.1: Initial career co-occurrence map. **A.** Resident co-occurrence map of initial career choice with income (30), ownership (18), quality of patient care (18), work-life balance (17), patient relationships (10). **B-C.** Female and male resident co-occurrence map breakdown, respectively. Text size is proportional to frequency of co-occurrences. Threshold of 15 co-occurrences

Our survey data supports our qualitative findings. Residents and working orthodontists were asked to rank factors most important to their initial career choice (Table 2.1; lower value of higher importance). Working orthodontists were also asked to rank factors most important to them when choosing their current employment after a job transition. Both residents and working orthodontists, regardless of gender, considered quality of patient care seriously when choosing their initial career. Income was unanimously the second most important factor for residents and working orthodontists alike when surveyed, again regardless of gender. Residents ranked work-life balance as third most important followed by mentorship, ownership and length of commute. Female residents significantly value mentorship over their male counterparts, while males value

ownership when choosing an initial career. Working orthodontists also ranked work-life balance as third most important followed by mentorship, ownership, and length of commute. Compared to their male counterparts, female orthodontists recalled significantly valuing income, while males valued ownership when choosing an initial career, fresh out of residency. Ownership and work-life balance were less important for both genders. When making a job transition, working orthodontists placed greatest emphasis on quality of patient care and work-life balance equally, followed by ownership and income respectively. Female working orthodontists considered length of commute as a more significant factor when choosing a career than their male counterparts. Data shows that factors important to initial career decisions have not changed significantly over the years for residents, with continued importance focused on income.

Table 2.1: Factors Important to Initial & Current Career Choice

	Residents				Working Orthodontics				R vs W
	All	Male	Female	p-value	All	Male	Female	p-value	p-value
Initial career choice									
Quality of patient care	2.3 (1.4)	2.4 (1.5)	2.3 (1.2)	0.731	2.4 (1.1)	2.3 (1.0)	2.7 (1.1)	0.002	0.423
Income	3.1 (1.4)	3.0 (1.5)	3.2 (1.3)	0.286	2.8 (1.6)	2.9 (1.6)	2.3 (1.4)	0.022	0.039
Work-life balance	3.2 (1.4)	3.4 (1.4)	3.0 (1.4)	0.075	3.3 (1.4)	3.3 (1.3)	3.4 (1.4)	0.593	0.316
Mentorship	3.3 (1.7)	3.7 (1.7)	2.7 (1.6)	<0.001	3.6 (1.9)	3.7 (1.9)	3.5 (2.0)	0.461	0.106
Ownership	4.0 (1.8)	3.4 (1.7)	4.8 (1.6)	<0.001	4.1 (1.8)	3.7 (1.8)	4.8 (1.5)	<0.001	0.655
Length of commute	5.1 (1.1)	5.1 (1.1)	5.1 (1.0)	0.631	4.8 (1.2)	5.0 (1.0)	4.3 (1.4)	<0.001	0.010

Current employment choice									
Quality of patient care					2.4 (1.1)	2.4 (1.1)	2.3 (1.0)	0.238	
Work-life balance					2.4 (1.2)	2.5 (1.2)	2.4 (1.3)	0.862	
Ownership					2.6 (1.6)	2.5 (1.6)	2.8 (1.7)	0.059	
Income					3.4 (1.2)	3.4 (1.1)	3.5 (1.3)	0.295	
Length of commute					4.9 (0.9)	5.1 (0.8)	4.7 (1.0)	<0.001	
Mentorship					5.2 (1.3)	5.2 (1.3)	5.3 (1.4)	0.824	

Influence of Debt on Residents and Early-Career Orthodontists

Conversations reveal that residents consider debt to be a significant factor influencing young doctors to focus on income and forgo practice ownership immediately after residency, causing a major shift in the profession towards associateships.

"I think back when our faculty was coming out. They were coming out with maybe $100,000 in debt so for them to come out with that little amount of debt and then say, 'I wanna buy a practice and take out a loan for another $500,000,' that may have been realistic. But for us, we're not in a position where we can now add an additional $500,000 loan to buy a practice outright." - *Resident*

A couple outliers were unconcerned about their debt and did not feel that it influenced their pursuit of ownership. They were aware of the cost inherent in becoming an orthodontist and were prepared to move forward with loan repayments.

"I don't think our debt is something that's gonna prevent us from practice ownership or buying a house. It might change the way we work the numbers. It might change our lifestyle more than it would change our future decisions." - *Resident*

Early-career orthodontists are grappling with repayment of their sizable debt and prioritize income over ownership to allow for repayment. Half of interviewees were unwilling to assume the financial risk of ownership after graduation, while the other half had jobs with defined ownership potential.

"What was most important to me was money, because coming out of school I had a tremendous amount of debt, and I was most keen to get that paid down so that I could start real life. So, profitability. I also wanted to be my own boss. I didn't want a super long transition with the other doctor, because again, I have a problem with authority, so I didn't want him to be able to tell me what to do."-Early-career doctor

Despite the debt, nearly all young practitioners acknowledged that ownership provides greater long-term financial gain. All interviewees, male and female, valued ownership and hoped to achieve it at some point in their career, if they were not already owners.

"Having a steady paycheck is advantageous the first few years that you are out, but if you stick to that over the course of your career, in the long run, you'll end up losing. I wouldn't judge anybody who goes to DSOs fresh out of school, but I think if you stay there longer than three to five years, then you're really shorting yourself in the long run."-Early-career doctor

Mid-career orthodontists were well-aware of rising educational debt and are sensitive to its potential effects. The average debt burden of these doctors upon graduation was lower than the younger practitioners (Table 1.2), which positively correlates with our quantitative data (Table 1.4). Working orthodontists recalled having significantly less debt than graduating residents by

over $100,000. Many mid-career doctors discussed how their decision to own shortly after residency may have been negatively impacted if they carried today's debt burdens. This group highly valued autonomy through ownership and emphasized its importance for long-term financial gain.

"[Debt] really hasn't affected my decisions, but had I been in a situation where I was exiting with $300,000 of student loans and a mortgage and having to start a practice…undoubtedly that would have probably pushed me more towards an opportunity where I was going to be an associate for a while just to be earning a pay check. That would have been a tall order to come out and on top of that type of debt, go ahead and borrow another half a million to start something. But it really has not affected me, thankfully." -Mid-career orthodontists

"Yeah. I think the debt…puts a huge burden on the student coming out. I think it makes it extremely hard for a new graduate to open a practice. Even to potentially associate. They need a certain amount of income, just to be able to make their student loan payments…" -Mid-career orthodontist

When early and mid-career orthodontists reflected on their initial career decisions, they valued ownership more highly than today's residents, regardless of gender. Today's residents discussed ownership and employment roughly equally, with each being considered as attractive initial jobs. The focus toward maximizing initial salary is steering residents toward initial employment options that have shorter term financial gain to provide for loan repayment and away from ownership that has longer-term financial benefits (Fig 2.2).

Our quantitative data support the reflections and responses of those interviewed. The focus residents are placing on initial income is linked to high student debt. When asked, over 80% of residents think about their debt often to all of the time and over 65% report their debt as stressful

to extremely stressful (Fig 2.3). Qualitative and quantitative data indicate that financial concerns are more pressing for residents graduating today than in past decades and this focus on loan repayment is steering residents towards initial employment rather than ownership.

	Resident			Early Career Orthodontist			Mid-Career Orthodontist		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Private Practice Owner	0.207	0.278	0.182	0.426	0.467	0.363	0.392	0.361	0.444
Private Practice Associate	0.207	0.241	0.195	0.287	0.262	0.325	0.144		0.250
Corporate or DSO	0.139	0.167	0.130	0.223	0.213	0.238			

Figure 2.2: Initial career frequency. Residents consider both employment and ownership opportunities as initial careers compared with their early career and mid-career counterparts who considered ownership more frequently than employment.

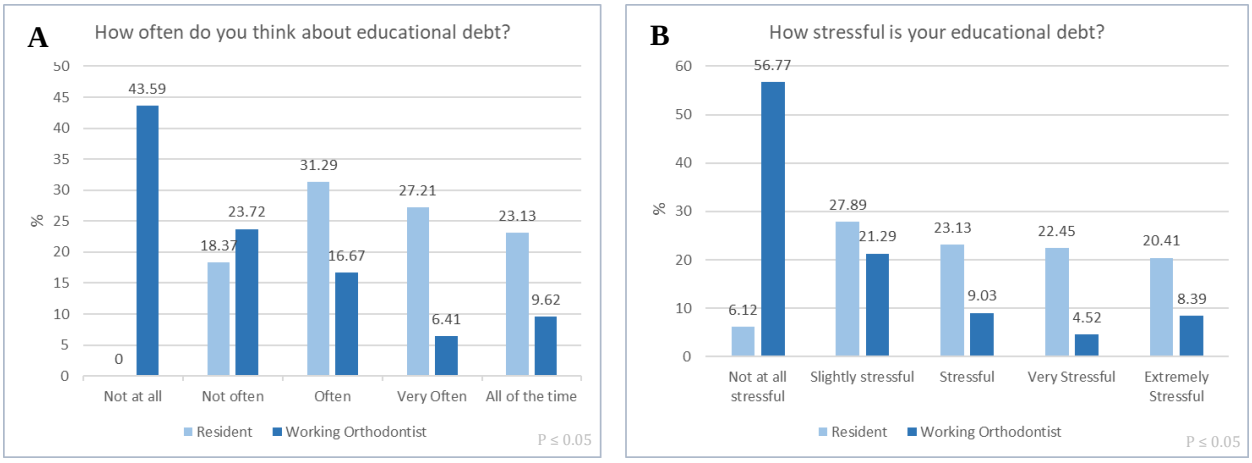

Figure 2.3: Impact of educational debt. **A.** The majority of residents report thinking about their educational debt often to all of the time. Working orthodontists reporting thinking about their educational debt not often or not at all. **B.** The majority of residents report educational debt as stressful to extremely stressful. The majority of working orthodontists consider educational debt not at all stressful.

Desire for Autonomy by Residents and Orthodontists

All residents (10/10) and most early-career orthodontists (6/10) cited the importance of long-term autonomy in the field of orthodontics, with an eye toward self-employment with increased income. For most residents and young doctors accepting associateship positions, it was

important that, at minimum, ownership was discussed. Mid-career orthodontists, who were mostly solo owners or partners, reflected on their need for explicit buy-in potential and/or ownership contracts, when first looking for positions after residency.

> *"I came straight out…the first job was basically the same job I'm in now. There was a pre-defined associateship period, but before I agreed to any of that and before I began, I wanted the buy-in piece, the equity stake to be cemented and defined before I went into it."-Mid-career orthodontist*

In contrast, graduating residents and early career orthodontists said it was rare to see an associateship opportunity with a defined pathway to ownership in today's market. Our quantitative data supports the shift away from defined ownership opportunities for graduating residents. Less than 5% of today's residents accepted positions with ownership contracts compared to 26% of working orthodontists, when they graduated (Fig 2.4). There is no significance between male or female residents with both genders securing fewer ownership agreements than in the past.

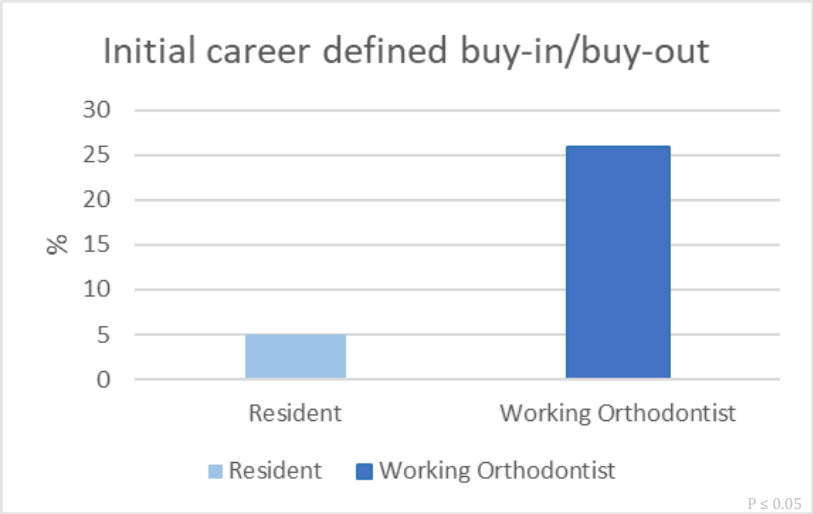

Figure 2.4: Decline in defined initial ownership agreements. Significantly fewer residents are accepting initial employment with a defined ownership agreement.

We also see a significant decrease in residents feeling prepared for ownership immediately after residency compared with their predecessors. Female residents feel significantly less prepared than their male counterparts (Table 2.2). One third of current residents are forgoing initial ownership due to their inability to afford a practice (Fig 2.5). However, older, practicing orthodontists recall delaying ownership because they lacked business management experience or had had competing interests with family responsibilities. Residents face greater financial obstacles when considering ownership, steering them towards employment and away from ownership initially. In addition, the landscape of current job opportunities has significantly more residents pursuing multiple associateships in their initial years post-residency to piecemeal together adequate working days compared with working orthodontists who recall employment with only one office.

Table 2.2: Perceptions on ownership preparedness

	Resident				Working Orthodontist				R vs WO
	All	Male	Female	p-value	All	Male	Female	p-value	p-value
Do/did you feel prepared to buy-out/in following residency	35% n=61	48% n=47	19% n=14	<0.001	48% n=158	55% n=126	33% n=32	<0.001	0.009
Do/did you feel prepared to start a practice following residency	28% n=48	36% n=35	18% n=13	0.014	43% n=141	48% n=110	32% n=31	0.010	0.001

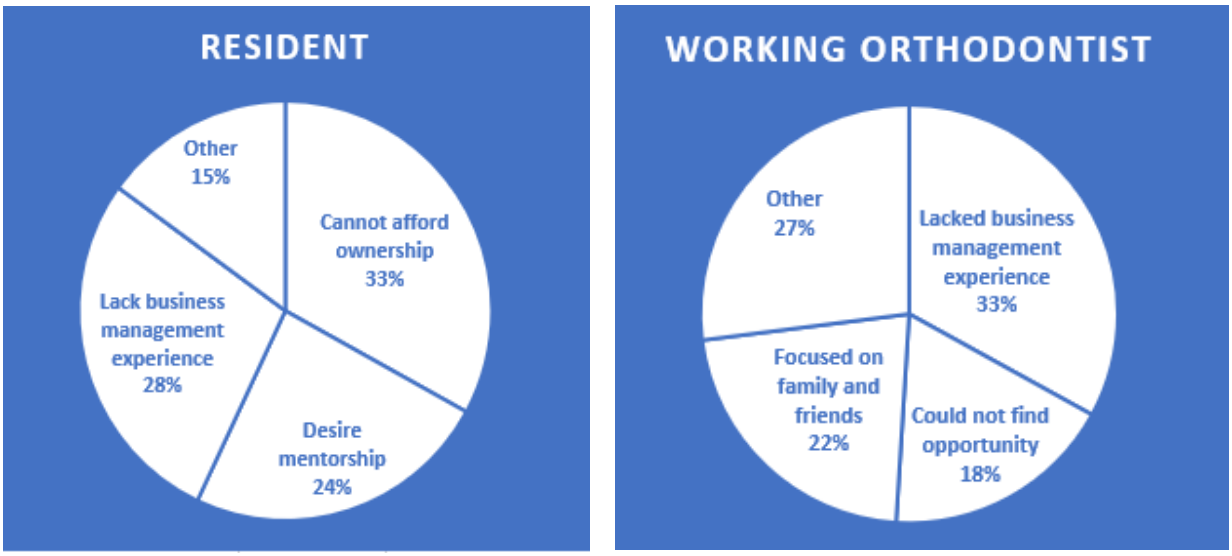

Figure 2.5: Factors contributing to perceptions of ownership unpreparedness. Residents are not pursuing ownership because they cannot afford it. Working orthodontists didn't pursue ownership because they lacked business management experience.

Despite this, graduating residents and early career orthodontists still value long-term ownership and plan to pursue it after their initial associateship positions. One early career orthodontist stated:

> *"There still is so much worth in owning, being an owner from a psychological perspective, from a financial perspective, that you will be selling yourself short to get the quick paycheck early, and not invest, buy something and invest in that community. I think the community will give it back to you, more so than just popping around to different jobs."* - *Early career orthodontist*

Our survey data was consistent with our interview responses. Within two years of graduation, 57% of residents plan to pursue ownership, with that proportion increasing to 94% within ten years of residency (Table 2.3). Both males and females plan to pursue ownership at nearly equal rates with no significant difference between genders. Nearly all residents, both males and females ranked self-employment followed by greater earnings as most important

reasons to pursue ownership. Pursuing ownership for increased schedule flexibility to improve work-life balance was ranked third suggesting that young orthodontists prefer self-employment despite acknowledging the added responsibility and time investment. However, when choosing an initial career, residents' income along with quality of patient care and work-life balance, are the most important factors for residents when choosing their initial career. Mentorship is significantly more important to females, while ownership is more important to males when considering initial employment (Fig 2.6).

Table 2.3: Long-term ownership plans

	Residents			
	All	Male	Female	p-value
Plan to pursue ownership in the next 2 years?	57% n=66	63% n=37	51% n=29	0.198
Plan to pursue ownership in the next 10 years?	94% n=47	95% n=21	93% n=26	0.701

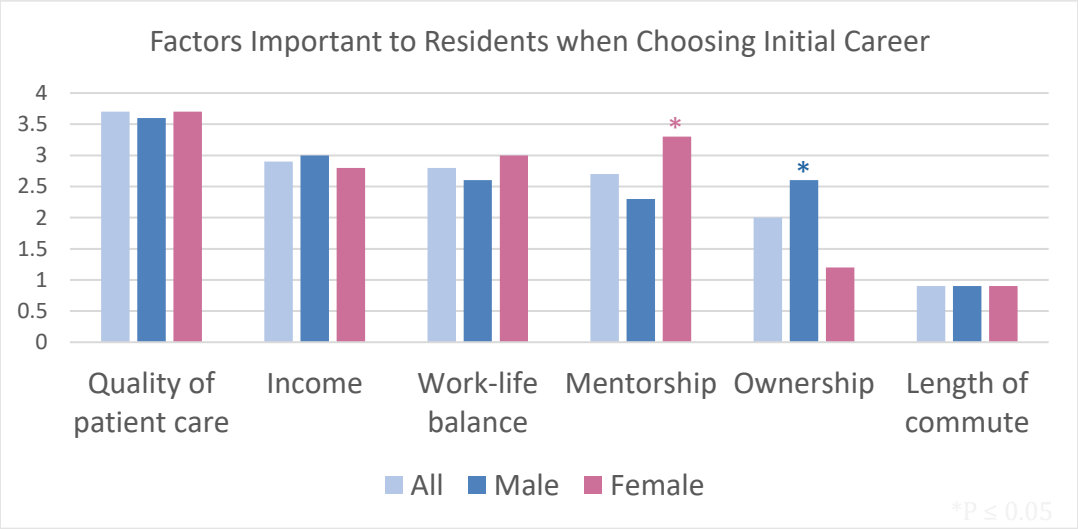

Figure 2.6: Factors important to residents when choosing initial career. Residents value quality of patient care, income and work-life balance when choosing a career initially. Mentorship is more important to females, while ownership is more important to males.

Mid-career orthodontists were enthusiastic about their journey to independence and firmly believed ownership was the preferred path, allowing for autonomy and maximal success. This sentiment was shared among women and men. Many acknowledged that employment options could offer higher initial salaries, but long-term financial success would be stunted by remaining an employee.

"But when you work for somebody else you're going to make a good salary when you get out, but you're not going to have the ability to make as much as you want to make. And so that is something that is surprising. The harder you work when you own your own business the more you make. And you have complete control over it."

One doctor in particular had pursued associateship positions with corporate and private entities, due to his debt burden, and offered some cautionary advice.

"There's nothing wrong with that corporate job. You just have to stick up for yourself. I don't want to disparage it. It just wasn't for me. There is a difference in price between working for a faculty member one day a week and corporate. But it's the price of what are they asking you to do. You have to read the fine print. Is it more money because it's ten hours instead of eight? Is it more money because you get one assistant instead of four? Is it more money because they don't let you use a lab? What are they asking you to do for more money is the question." -Mid-career orthodontist

Survey data supports that when working orthodontists pursued a job transition, the most important factor for both males and females was ownership potential elsewhere. Other important factors for transitioning were professional growth and insufficient income for males, with females citing incompatible treatment approach and need for relocation (Table 2.4)

Table 2.4: Factors important when deciding to transition jobs

	Working Orthodontist			
	All	Male	Female	p-value
Ownership potential elsewhere	25% n=83	26% n=60	23% n=23	0.585
Insufficient income	13% n=43	12% n=28	15% n=15	0.481
Treatment approach and/or standard of patient care incompatible with preferred approach	13% n=45	11% n=26	19% n=19	0.080
Professional growth	12% n=41	13% n=31	10% n=10	0.469
Poor relationship with employer and/or partner	12% n=40	11% n=27	13% n=13	0.718
Relocation	9% n=32	6% n=15	17% n=17	0.005
Poor work-life balance and/or lack of flexibility	7% n=22	5% n=12	10% n=10	0.148
Long commute	5% n=17	3% n=8	9% n=9	0.055

Autonomy and self-employment have remained important to orthodontists, new and experienced, but the financial landscape has necessitated a change in timing, with more new doctors temporarily forgoing ownership to repay loans as employees, prior to purchasing or starting a practice. Mid-career orthodontists were financially situated such that ownership immediately after residency was more feasible.

"I did want to have ownership in a practice to have the autonomy. But I didn't really know what that meant at the time. I just thought I wanted it. And I'm glad I did. But I didn't fully understand what I was getting into." -Mid-career orthodontist

Working orthodontists, who are not currently owners and do not plan to pursue ownership, wish to avoid the stress of business management and improve their work-life balance. The non-owner population who responded to our survey was very low and overall survey responses confirms that ownership remains an ultimate career goal for the majority of residents,

and is a priority for the profession among trainees and working doctors. However, the journey to ownership has lengthened due to financial concerns (Fig 2.7).

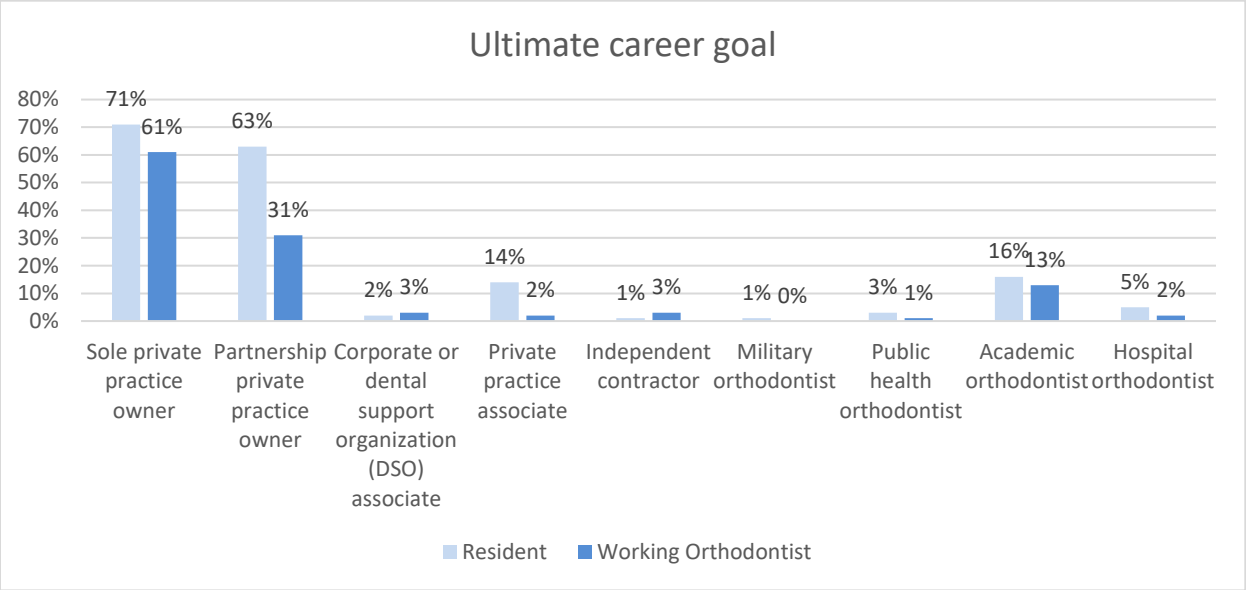

Figure 2.7: Ownership remains ultimate career goal. Residents value ownership in the long-term.

Roles of Geography and Work-Life Balance in Initial Employment Decisions

Apart from debt and autonomy, the vast majority of residents (8/10), early-career and mid-career orthodontists (4/5) cited geography as a top consideration.

"Geography definitely played a role. I chose based on where I could see myself living long-term and whether or not I had friends in the area, if I was able to make contacts, [and] whether or not there was growth potential in the area."-Resident

When considering location, most residents (10/10), early-career (5/10) and mid-career (4/5) orthodontists searched for positions close to their family, their partner and/or their partner's family; this applied equally to men and women. Some interviewees chose employment over ownership to be in a particular location for themselves or a spouse, and planned to pursue ownership once established in the area. For single residents, geographic flexibility and urban living were particularly important; long-term, they wanted to have freedom to move from the

urban center to suburbs or elsewhere. For married and partnered residents, their significant other was a key consideration; for dual-career couples, it was important that the orthodontist not be tied to one location in case their partner's professional path took them elsewhere. Lastly, some residents wanted to experience living in a region to learn about it, before committing to ownership. Geographic location was a universal consideration for residents regardless of gender or debt status.

> *"I was fairly settled on the location and I was ready to start a practice if I needed to, to live where we wanted to live. So for me, I limited myself geographically and thankfully, I had a good opportunity within that geographic area. But that's not always the case."- Early-Career Doctor*

After geography, work-life balance was a primary factor in considering first employment among most residents (5/10) and practicing doctors (5/10) of both genders. Several residents believed pursuing ownership after graduation would compromise work-life balance, with long hours and intense work. Most residents cited the ability to travel as a key feature of work-life balance.

> *"I foresee that maybe as an associate that [work-life balance] may change a little bit, but if there were ever a buy-in anywhere…,then that will definitely change. It will be tougher. It'll take more effort to maintain that [work-life] balance. -Resident*

For residents and early-career doctors who identified as married or as having children, the majority kept their family in mind during their job search; getting married and having children shifted their focus from a career-driven lifestyle to one that was more balanced and placed their family first. These individuals, regardless of gender, mentioned that employment options were

more ideal than ownership, allowing them more schedule flexibility, the ability to commit to childcare responsibilities, and more time to devote to their spouses and children.

> *"Getting married, having more of a family-oriented approach to life rather than a career driven life. I knew either way family is still going to be a huge part in my life, like orthodontics is, and I'm happy about that, but I think I started to realize that maybe I didn't want to jump right into owning a practice and working, like never really being able to put it down, at least initially until I kind of knew a little bit more about what I was getting into and maybe seeing what other opportunities were out there, like if there was a partnership that may be a better option for me."-Resident*

Single residents often reported that they would consider working more days after graduation, since they did not have the responsibility of a spouse or child. Single residents were just as or less likely to pursue ownership opportunities as their married colleagues. In their view, ownership was geographically restricting and single residents wanted to keep their options open if a serious relationship necessitated a geographic change. Single residents were more likely to consider employment options in urban settings to provide them with social avenues to meet others, where they did not expect to stay for the entirety of their career.

> *"As of right now, I'm pretty open to doing five days a week because I don't have kids and don't have that much responsibility, but I do enjoy traveling and things like that. I would want to be able to keep doing that." -Resident*

Over time in the working world, orthodontists' views of work-life balance changed, regardless of sex. As financial independence was achieved by mid-career orthodontists, time became a more valuable commodity, with doctors wanting to spend more time with loved ones and interests outside of work. A female mid-career orthodontist shared the following sentiments.

"I think you get to the point where your income isn't one of the things you're worried about. It's, "Oh my gosh. I need more time. I need more time to get my office work done. I need more time to be with my kids. I need more time to be with my husband. I need more time to be with my friends." So, I think that's what, at my dental school reunions and at the ortho meetings, that's what everybody talks about once you hit between year five and ten. It hits everybody at a different time. But usually, income isn't ... one of the things you're talking about. It's more like, 'Oh my gosh. I have no free time.'"

A male mid-career orthodontist shared similar feelings in the following quote.

"And I don't know where it exactly happens, but all of the sudden you're willing to give up income to get more time. It becomes that time's more important to you."

In our survey results, we see similar trends. After achieving financial stability, working orthodontists desire more time with family, friends and interests outside of work, regardless of gender. However, work-life balance was less of a priority for residents, who ranked financial stability, paying off student loans, ownership and treatment outcomes before work-like balance (Fig 2.8). This shift of values away from income and towards family by mid-career doctors, begs the question: for younger doctors who will associate for longer and achieve financial independence later in life, will they be forced to forgo time with their children and family due to their educational debt?

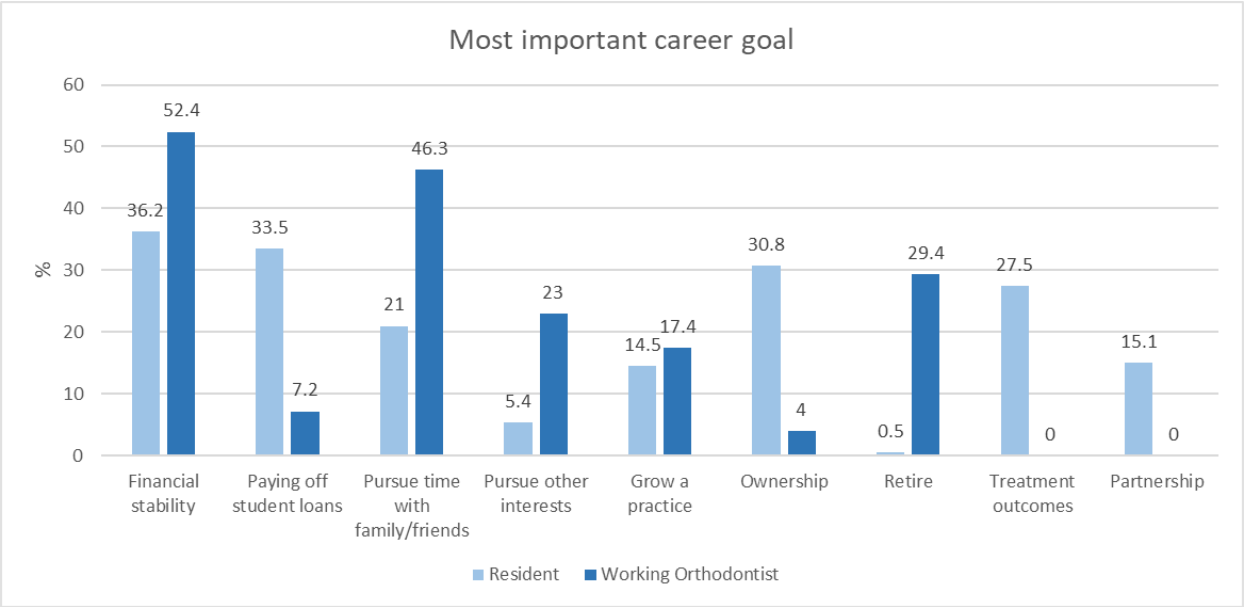

Figure 2.8: Most important career goals. When asked to choose their two most important career goals, residents selected financial stability and paying off student loans. Working orthodontists desire financial stability and pursuing time with family and friends.

Impressions on Corporate/DSO employment opportunities

Lastly, we discussed the onset of corporate and dental support organization opportunities within the field of orthodontics. Residents, early and mid-career orthodontists were aware of their increasing prevalence in the field. All residents interviewed said they were open to considering a job with a dental support organization. All of them mentioned encountering corporate or DSO opportunities during their job searches. Some viewed these opportunities as purely transitional that would enable them to pay down student loans while improving clinical speed and learning more about the business. Others who interviewed with some corporate opportunities stressed the importance of being highly selective with different organizations to make sure they are ethically sound in their treatment practices. Many residents found that corporate models were looked down upon by their faculty within residency programs and that they were being encouraged to only consider private practice opportunities.

"They [the faculty] want us to all join private practices or open our own practices, things like that, but …I just am in a different mindset, I guess."

Early career orthodontists were similarly open to corporate models and agreed their presence is not going away anytime soon. They were quick to offer advice for residents encouraging them to set goals and timelines for their careers. If a steady and guaranteed income is needed immediately after graduation and if corporate is the chosen avenue, it is understandable. However, early career orthodontists stick to the notion that private practice ownership is the most financially rewarding in the long run.

"Like I said before, having a steady paycheck is advantageous the first few years that you are out, but if you stick to that over the course of your career, in the long run, you'll end up losing. I wouldn't judge anybody who goes to DSOs fresh out of school, but I think if you stay there longer than three to five years, then you're really shorting yourself in the long run."

In addition, some early career orthodontists added that corporate dentistry offers a new model relieving doctors from the stress and responsibility of business ownership. This may allow orthodontists to focus on family, friends and other interests outside of orthodontics. However, most early career orthodontists agree that the presence of corporate and DSO entities will change the employment landscape, decreasing the number of ownership opportunities for new graduates.

"I think you've got to be really careful. That's definitely the direction things are headed. I think it's going to hurt our profession a little bit, but I think a lot of people are going to like it. I think a lot of new grads will like it. I think, no offense to you, I don't know if you're married or have kids or whatever, but I think a lot of females will like it because they can work in environments where they don't have to deal with the stress of business ownership, and still have flexible hours, make a decent living, and not be as isolated. So, I think that there's some good things

for it, but it's going to take away a lot of the opportunities that some graduates really want and really look forward to."

Lastly, only one of the mid-career orthodontists worked with a corporate dentistry practice. Most (4/5), did not come across corporate opportunities when they were applying for jobs at the end of their residency. However, again, mid-career orthodontists are not happy with the influx of corporate in the field but understand why new graduates are drawn to them for initial career options. Similar to early career orthodontists, mid-career orthodontists offer the following advice to new graduates who may be prone to accepting a corporate opportunity primarily due to the seemingly lucrative financial gain.

"There is a difference in price between working for a faculty member one day a week and corporate. But it's the price of what are they asking you to do. You have to read the fine print. Is it more money because it's 10 hours instead of eight? Is it more money because you get one assistant instead of four? Is it more money because they don't let you use a lab? Is it more money because they don't let you do and just expect you to leave them class two? What are they asking you to do for more money is the question to ask."

Mid-career orthodontists also discussed the impact corporate dentistry is having on practice owners. Corporate and DSOs are in the position to offer selling doctors, especially those that are property owners, very high selling prices that no graduating orthodontists can afford. This is placing selling doctors in a hard position. They don't want to 'sell out' to corporate but if it means setting their families up financially for generations to come, it is a hard opportunity to pass up. Some truly believe it will be the only option for owners when it comes time to sell and therefore they are less interested in long-term ownership themselves.

"Oh yeah, absolutely. When you asked why I wasn't a majority owner it's because I don't want to be because I don't think there's going to be anything to sell when we're done."

Qualitative survey data supports our qualitative findings. A significantly higher percentage of residents are willing to work for corporate entities compared with working doctors. Both male and female residents responded yes or maybe to willingness to work for corporate or DSO similarly with no significance between genders. Only 29% of residents responded they are unwilling to work for corporate compared with 54% of working orthodontists (Fig 2.9).

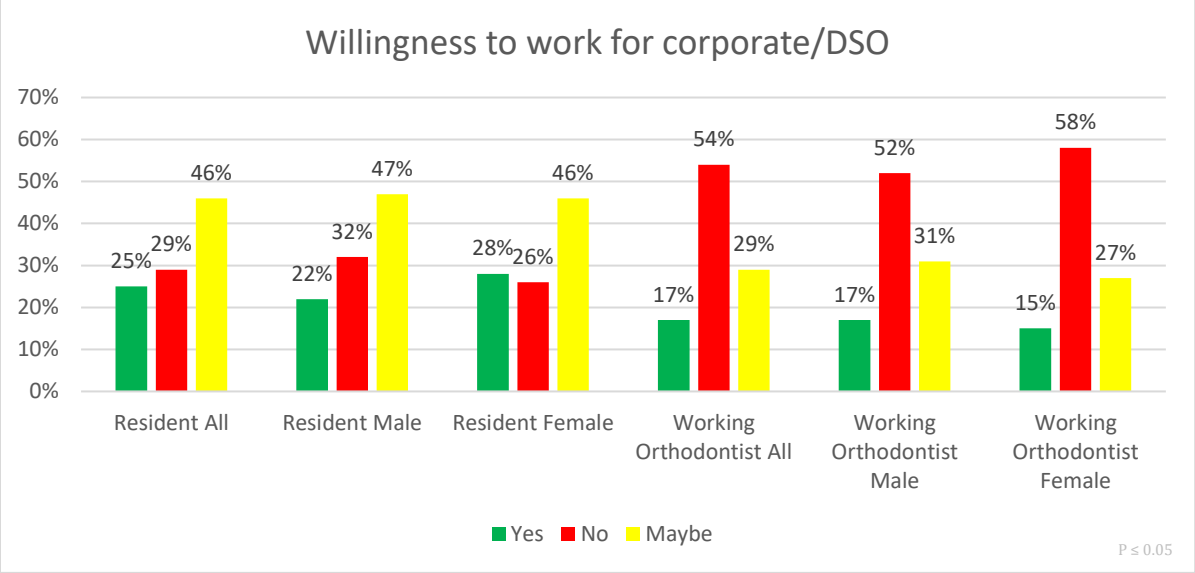

Figure 2.9: Willingness to work for corporate/DSO entities. Residents were more open to employment with corporate/DSOs compared with working orthodontists ($p < 0.001$).

For those open to employment with corporate entities, the majority of residents chose autonomy in treatment decision making at the most important factor if comparing opportunities. Male residents were most concerned with a lucrative salary when considering corporate opportunities while females were most concerned with sound practice ethics which was a more significant concern than that reported by male residents. Across genders, male and female

working orthodontists were most concerned with a lucrative salary or selling price if considering a corporate or DSO opportunity (Table 2.5).

When considering greatest reservation with corporate employment, residents were most concerned with compromised practice ethics and compromised patient care regardless of gender. Males were more significantly concerned that corporate would compromise the future of the orthodontic profession while females were more significantly concerned that corporate will compromise patient care. Both males and females were concerned with the impact on loss of ownership and autonomy in the field. Working orthodontists, regardless of gender, were primarily concerned with compromised patient care and loss of ownership/autonomy. Their concern for ownership loss in the field is significantly greater than resident's concern (Table 2.5).

When working orthodontists were asked if they would be willing to sell their practice to corporate the majority (43%) answered no with 38% responding maybe and 19% responding yes. Looking further at gender responses 21% of males responded yes, 39% maybe and 40% no. Females were less likely to sell to corporate with 50% answering no and only 13% responding yes. The majority of male and female working orthodontists cited lucrative selling price as the top reason to consider selling their practices to corporate or DSOs with 58% in agreement on this.

Table 2.5: Factors important to employment decisions with corporate/DSO entities

	Residents				Working Orthodontics				R vs WO
	All	Male	Female	p-value	All	Male	Female	p-value	p-value
What is most important to you when considering Corporate/DSO employment?									
Autonomy in treatment	38% n=67	36% n=36	41% n=31	0.530	24% n=80	24% n=57	23% n=23	0.782	0.001

decision making									
A lucrative salary and/or selling price	36% n=64	41% n=41	31% n=23	0.206	28% n=95	28% n=66	28% n=29	1.000	0.070
Sound practice ethics	32% n=56	23% n=23	44% n=33	0.003	6% n=20	7% n=16	4% n=4	0.452	<0.001
Excellent patient care	29% n=51	28% n=28	31% n=23	0.738	19% n=65	21% n=49	16% n=16	0.296	0.015
Business management support	10% n=18	11% n=11	9% n=7	0.806	5% n=17	6% n=13	4% n=4	0.787	0.041
Equity in the corporation or DSO	5% n=8	7% n=7	1% n=1	0.140	4% n=13	5% n=11	2% n=2	0.358	0.815
What is your greatest reservation when considering Corporate/DSO employment?									
Compromised practice ethics	57% n=100	52% n=53	63% n=47	0.219	41% n=137	40% n=94	42% n=43	0.719	0.001
Compromised patient care	51% n=89	44% n=44	60% n=45	0.034	55% n=185	56% n=132	52% n=53	0.478	0.353
Loss of ownership/ autonomy	35% n=61	38% n=38	31% n=23	0.423	51% n=173	53% n=125	47% n=48	0.343	<0.001
Compromised future of orthodontic profession	30% n=52	37% n=37	20% n=15	0.020	25% n=83	24% n=56	26% n=27	0.680	0.246
Lack of job security	6% n=11	6% n=6	7% n=5	1.000	8% n=26	8% n=18	8% n=8	1.000	0.594
Other	3% n=5	3% n=3	3% n=2	1.000	4% n=15	4% n=9	6% n=6	0.400	0.475

Financial success and work-life balance linked to job satisfaction

An additional aim of this study was to identify factors most important to job satisfaction. Residents and working orthodontists most frequently discussed financial success as the main

contributor to job satisfaction. Following that, residents believed work-life balance and delivery of high-quality care would enhance job satisfaction (Fig 2.10). Our survey results were consistent with these findings, except residents, regardless of gender, ranked work-life balance higher than financial success (Fig 2.11). Working orthodontists, regardless of gender, attributed job satisfaction to financial success, autonomy in decision-making, and work-life balance (Fig 2.9). Female working orthodontist regarded treatment decision autonomy as a significantly more important factor in job satisfaction than male doctors. Financial success, quality patient care and work-life balance are key contributors to job satisfaction for working doctors and residents, confirmed by interviews and our nation-wide survey (Fig 2.10).

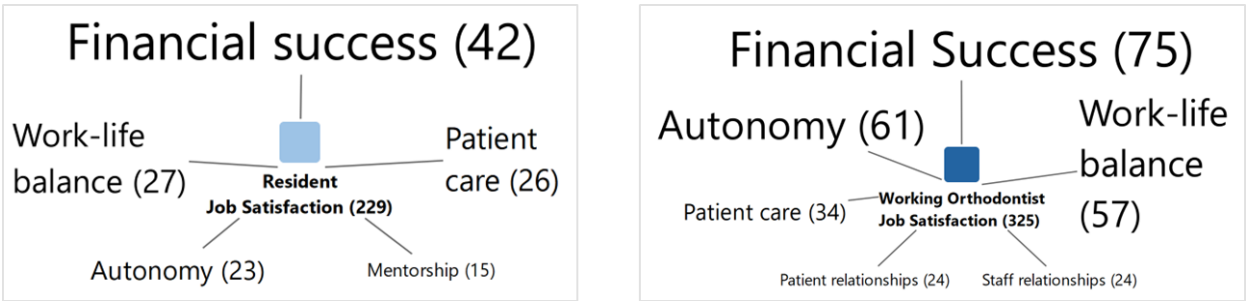

Figure 2.10: Frequency of factors important to job satisfaction. Residents spoke most frequency about financial success, work-life balance and patient care when referring to job satisfaction, while working orthodontists most frequently cite autonomy in decision making and work-life balance after financial success. Frequency factor set at 15.

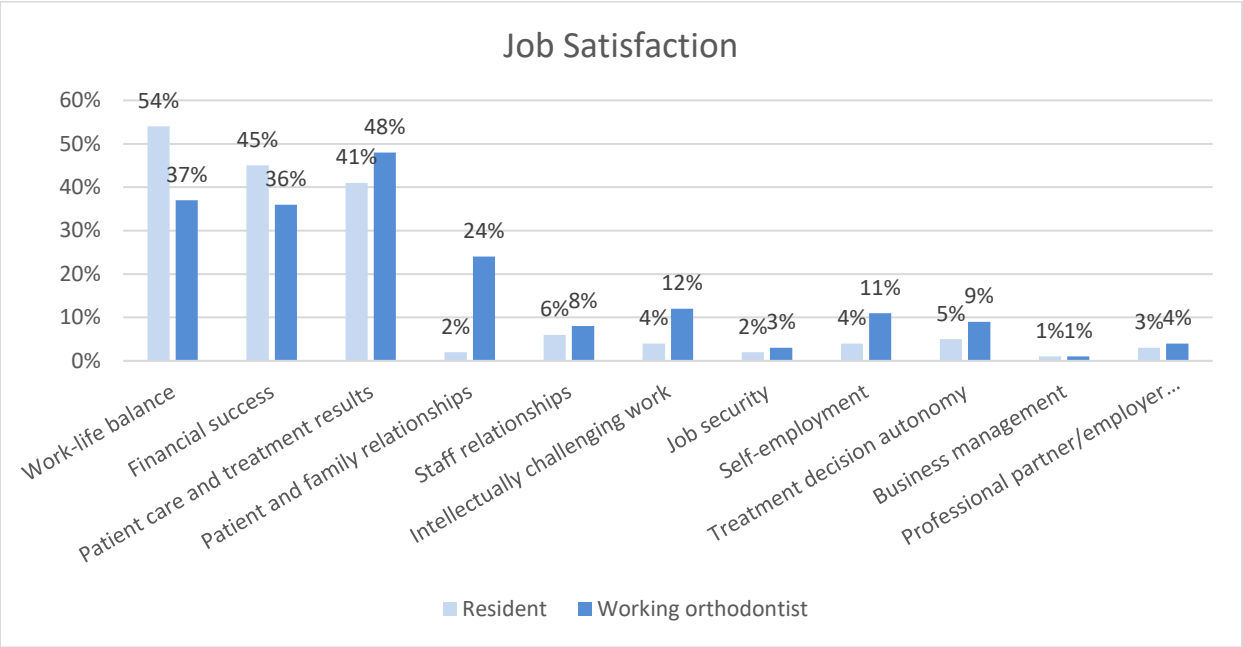

Figure 2.11: Factors important to job satisfaction. Residents anticipate work-life balance and financial success will be most important with working orthodontists ranking patient care & treatment results, and work-life balance as most important.

Interviews revealed that student debt and repayment is an anticipated job stressor of orthodontic residents entering the workforce. Residents also cited an increase in volume of patients as an anticipated stressor. Meanwhile, working orthodontists talked about the stresses of running a business and handling staffing concerns. Our quantitative survey results delved deeper into the anticipated or current stressors of residents and working orthodontists respectively by asking respondents to rank the top two stressors in their current employment. We found that overall, business management and financial stress related to debt were equally the most significant stressor for residents (45%). There were no statistically significant differences between males and females. Working orthodontists cited staff relationships as their number one stressor with males more significantly stressed out about this compared with females. Females were most concerned about business management however they were not statistically more worried than their male counterparts who also viewed business management responsibilities as a stressor (Table 2.6).

Table 2.6: Factors contributing to job stress

	Residents				Working Orthodontics				R vs WO
	All	Male	Female	p-value	All	Male	Female	p-value	
What contributes most to stress in your job?									
Business management	45% n=79	44% n=44	47% n=35	0.760	40% n=136	39% n=91	44% n=45	0.398	0.346
Financial stress (income, debt)	45% n=80	47% n=47	44% n=33	0.761	31% n=105	31% n=73	31% n=32	1.000	0.002
Patient care and treatment results	18% n=31	19% n=19	16% n=12	0.692	23% n=77	23% n=53	24% n=24	0.888	0.173
Patient and family relationships	5% n=8	5% n=5	4% n=3	1.000	7% n=24	6% n=13	11% n=11	0.106	0.336
Staff relationships	38% n=67	41% n=41	35% n=26	0.438	45% n=151	49% n=115	35% n=36	0.024	0.158
Lack of work-life balance and/or flexibility	13% n=23	12% n=12	15% n=11	0.654	20% n=66	19% n=44	22% n=22	0.553	0.067
Job security	4% n=7	5% n=5	3% n=2	0.700	4% n=13	4% n=9	4% n=4	1.000	1.000
Professional partner and/or employer relationship	11% n=19	10% n=10	12% n=9	0.807	5% n=18	6% n=13	5% n=5	1.000	0.030
Intellectually challenging work	5% n=8	2% n=2	8% n=6	0.074	2% n=8	3% n=7	1% n=1	0.443	0.190
Treatment decision autonomy	7% n=12	4% n=4	11% n=8	0.128	2% n=7	2% n=4	3% n=3	0.436	0.012
Self-employment	2% n=4	3% n=3	1% n=1	0.637	7% n=24	7% n=16	8% n=8	0.818	0.023

During our interviewing process, residents, early and mid-career orthodontists were asked to comment on their overall satisfaction with entering the field. Although some concerns were raised, mainly due to the rise of corporate opportunities along with direct to consumer orthodontics, the majority of all interviewed are satisfied with their decision to enter the field. Many indicated they would re do their journey if they had to and would encourage their kids to enter the field if they showed interest. Some said they would encourage their children to enter the field but would make sure to only encourage it if their children showed initial interest and would warn them of the long and expensive educational journey. Our quantitative survey data supports our qualitative interviewing data. Overall, we found that 77% of residents report being very satisfied or extremely satisfied with their decision to enter the field of orthodontics with that number rising to 85% for working orthodontists (Fig 2.12). In addition, the majority of residents and working orthodontists, regardless of gender, would encourage others to enter the field and would choose to enter the same career if they had to start over (Table 2.7).

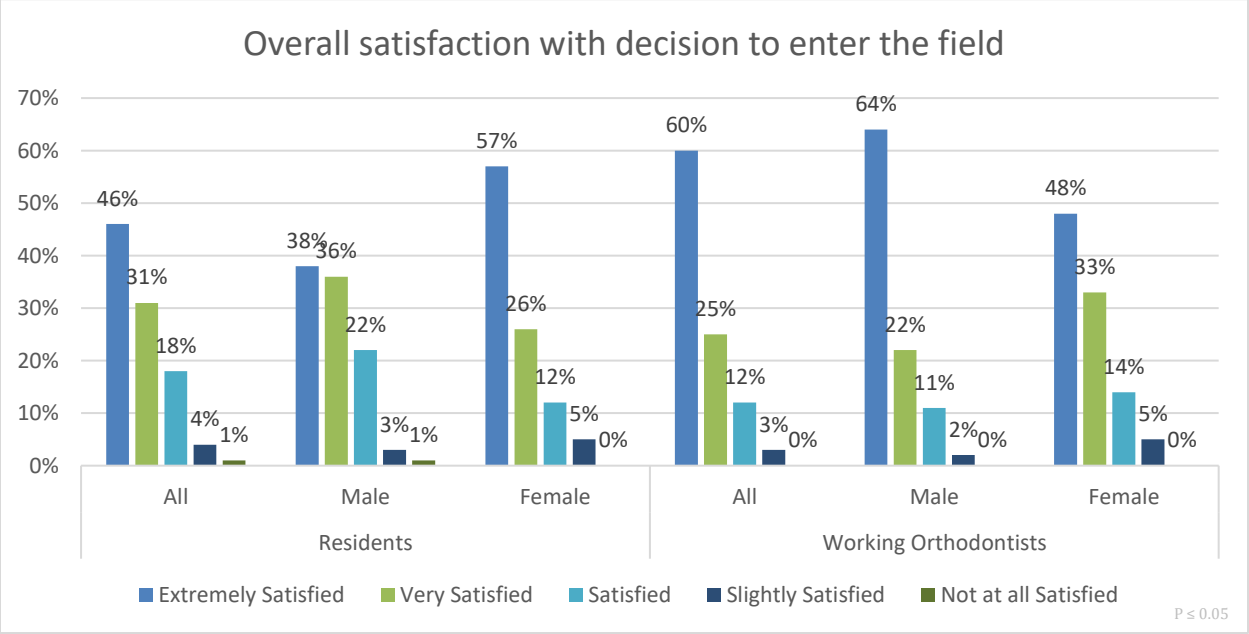

Figure 2.12: Overall satisfaction with decision to enter the field. Both residents and working orthodontists have high overall job satisfaction with the majority very satisfied or extremely satisfied.

Table 2.7: Impressions on entering the orthodontic field

	Residents				Working Orthodontics				R vs W
	All	Male	Female	p-value	All	Male	Female	p-value	
Would you encourage child or close family member to enter the field of orthodontics?									
Yes	76% n=131	71% n=70	82% n=61	0.242	63% n=204	64% n=147	58% n=57	0.530	0.008
No	9% n=15	10% n=10	7% n=5		15% n=50	15% n=34	16% n=16		
Maybe	15% n=26	18% n=18	11% n=8		22% n=72	21% n=47	26% n=25		
If you were to start over today would you choose to enter the field?									
Yes	90% n=155	88% n=86	93% n=69	0.222	73% n=238	73% n=166	73% n=72	0.891	<0.001
No	5% n=8	7% n=7	1% n=1		13% n=44	14% n=32	12% n=12		
Maybe	5% n=9	5% n=5	5% n=4		13% n=44	13% n=30	14% n=14		

When asked to rank their top two concerns with the future of the field, male residents listed concern with the saturated orthodontic market (46%) and rise of corporate dentistry (42%). Female residents were most concerned with direct-to-consumer products (57%), more significantly than males, and the saturated orthodontic market (44%). 50% of working orthodontists, regardless of gender, were most concerned over the growth of corporate and DSOs with secondary concern existing over the growth of direct-to-consumer products (Table 2.8).

Table 2.8: Concerns regarding the orthodontic field

	Residents				Working Orthodontics				R vs W
	All	Male	Female	p-value	All	Male	Female	p-value	
What concerns do have regarding the field of orthodontics?									
Growth of direct-to-consumer products	48% n=84	41% n=41	57% n=43	0.033	44% n=148	43% n=102	45% n=46	0.812	0.455
Saturated orthodontic market	45% n=79	46% n=46	44% n=33	0.879	39% n=130	39% n=92	37% n=38	0.808	0.185

Growth of corporate and/or DSOs	41% n=73	42% n=42	41% n=31	1.000	50% n=169	48% n=113	55% n=56	0.286	0.063
Length and/or cost of education	24% n=42	27% n=27	20% n=15	0.372	25% n=84	27% n=63	21% n=21	0.273	0.829
Decline in income potential	19% n=34	23% n=23	15% n=11	0.247	14% n=47	11% n=26	21% n=21	0.026	0.126
Decrease in desire for ownership among millennial orthodontists	4% n=7	4% n=4	4% n=3	1.000	8% n=26	9% n=20	6% n=6	0.508	0.129
Decrease in desire for ownership among women orthodontists	3% n=5	2% n=2	4% n=3	0.652	2% n=8	3% n=7	1% n=1	0.443	0.772
No concerns	1% n=1	0% n=0	1% n=1	0.426	1% n=5	2% n=5	0% n=0	0.328	0.669

Discussion

Mixed methods studies are new to research in orthodontic literature. The uniqueness of this research methodology allows us to answer social science natured questions important to the field. To explore such a broad field related to career decisions, we relied on methodological pluralism through our qualitative interviewing phase to purposefully craft a quantitative survey. The qualitative portion of our study effectively identified factors important to career decisions and transitions of residents and working orthodontists, along with factors important to job satisfaction, due to the flexible and explorative nature of interviewing providing depth and breadth[19,24]. During the survey phase of our study, we successfully tested the statistical generalizability of qualitative results with a much larger participant pool. This sequential mixed

methods research approach proves powerful by merging the advantages of both qualitative and quantitative research[24].

As discussed in the introduction, debt is ever increasing for students entering the dental and orthodontic professions. One report averages student loan debt of an orthodontic resident at $418,722 between 2008 and 2017[1]. Another report indicates that the average debt for dental school graduates in 2016 is $262,119 with 38% of orthodontic graduates accruing over $400,000, 55% accruing $300,000 and 71% accruing at least $200,000 in debt[14]. These percentages combine the average $103,430 cost of residency tuition, reported for the 2016-17 academic year, with prior student debt accrued from undergraduate and dental school studies[1]. Our survey results report an average student debt load of $302,180 ± 246,271 for all respondents, with a male breakdown of $296,939 ± 250,701 and a female breakdown of $309,122 ± 241,803. There is no significant difference between male and female debt levels and this study is in line with national debt averages.

Through our mixed research we found that quality of patient care, income and work-life balance are very important factors to orthodontic residents when choosing their initial career. There was no significant difference between males and females, indicating that both have similar objectives when choosing an initial career. We do see that males ranked ownership value significantly higher than females when choosing an initial career, however ownership was ranked fourth overall for males. Females choose mentorship more significantly than males as an important factor. This was their second ranked most important factor after quality of patient care and before work-life balance. For females, income was ranked fourth and ownership ranked fifth out of six choices. When comparing orthodontic residents to working orthodontists when reflecting on their initial career, we see very similar patterns of importance. It is important to

note that female residents ranked ownership higher than working orthodontists supporting the notion that ownership remains an important goal for female orthodontist entering the profession. When working orthodontists were asked what was most important to them when choosing to transition into a new career, work-life balance and ownership took the lead after quality of patient care surpassing income for both males and females. We also see that mentorship, second ranked for female residents, drops to sixth rank for working orthodontists indicating a gain in confidence and preparedness lending to ownership.

It may not come as a surprise to see that student debt is negatively impacting orthodontic residents with the majority of them thinking about their educational debt often to all the time. In addition, we report that both males and females are considerably stressed out about their debt levels reporting them as stressful to extremely stressful. Debt is impacting the everyday though process of our graduates and is surely impacting the decision to consider employment options that will provide adequate income to address loan responsibilities. This is no different for our male or females entering the profession.

Ownership is still important to orthodontic residents, however, both males and females are delaying initial ownership because they cannot afford it. Our survey data confirmed that affordability, followed by a desire for mentorship, and perceived lack of business management experience are the top three reasons for both male and female residents to delay ownership goals. Despite this, over 50% of male and female residents plan to pursue ownership within two years of graduating residency and over 90% plan to pursue ownership within 10 years of graduating from residency.

If we take a step back and look at data from the ADA's Health Policy Institute, we can also see that practice ownership is declining among dentists in general, across all specialties. In

2005, 44% of dentists under the age of 35 were owners with 83.4% owners between the age of 35-44. In contract, those numbers decreased significantly by 2017 with 28.4% of those under 35 reporting ownership and 74.1% of those between 35-44 reporting ownership. Interestingly, ownership rates remained relatively constant, between 85% to 93% for dentists aged 45-54 years, 55-64 years, and 65 years and over. Data from this report also suggests that both male and female ownership has declined at a similar rate from 2005 to 2017 with overall ownership declining from 84.2% to 77.5%.

One reason for this may be the decline in available ownership positions available to graduating orthodontic residents[14]. Our study confirms that fewer orthodontic residents, both males and females, have defined buy-in or buy-out agreements when signing contracts for their initial contracts. This is a 20% decrease from working orthodontists when asked to recall the same question as it applied to their initial employments. The influence of affordability is combined with lack of available opportunities to orthodontic residents. That is further complicated but data from our study showing that 19% of working orthodontists reported they would certainly consider selling their practices to corporate/DSO entities and another 38% responding maybe they would consider. With a lucrative selling price as the most important factor for the decision-making process of these 57% of working orthodontists, residents who cannot match the lucrative selling price of corporate and DSO entities may continue to expect fewer and fewer ownership opportunities available to them as corporate and DSO entities take a foothold within our profession.

Regarding preparedness to enter into an ownership role, we see that current residents feel significantly less prepared to pursue ownership compared with their working orthodontist counterparts when reflecting on their level of preparedness following residency. We see that

perceived preparedness drops from 48% to 35% when discussing ownership via buying-into a practice or buying-out a practice. That number drops even further from 43% to 28% when defining ownership as starting a practice. Our survey data also reports a significant difference between male and female graduating orthodontic residents that demands discussion. Female residents report significantly less preparation regarding ownership than their male counterparts despite the same training. Working orthodontist females also reported significantly less preparation when recalling their initial career. The results from these questions need to be addressed by orthodontic residency programs. In revamping curriculums, we need to focus on preparing our residents, both males and females, for ownership roles following residency. We need to address the challenges as educators and direct students in the right direction with regard to how employment and ownership in the field can impact them in the long run. Specifically, regarding females, we need to address reports in gender confidence gaps and challenge both male and female residents to feel equally prepared initially. Women tend to experience more self-doubt regarding their job performance and career performance, with many studies and reports quantifying this[25,26]. During a two to three-year residency, we hope our study results can encourage curriculum directors to place importance on preparing our residents for ownership and directly addressing the variety of concerns of residents and how these concerns may differ between males and females. As seen in our study, ownership potential is the most important reason for both male and female working orthodontists to transition to a new job. It needs to be the goal of orthodontic educators to maintain this as the most important reason and to educate residents on the long-term gains of ownership within the field. Based on our current survey data, we do see the majority of residents indicating long-term goals of ownership but the rise in those indicating long-term employment goals should not go unnoticed. Orthodontic educators should

heed to the advice of early and mid-career orthodontists who acknowledge why residents are forced to consider employment opportunities due to steep debt burdens, yet offer encouragement to seek ownership as early as possible for the long-term financial success.

Encouraging data from our study is the high overall career satisfaction reported by both resident and working orthodontists, regardless of gender. Both residents and working orthodontists report they would choose the same career path over again if forced to, and would support the decision of children or loved ones to enter the field. Residents and working orthodontists share concern that the growth of direct-to-consumer products, saturated orthodontic markets, and corporate/DSO entities may negatively impact the future of our field. Future research into these areas may provide additional insight into what we as a profession can do to mitigate the impact of these marketplace changes on orthodontic professionals. One study offers insight into the patterns of consumers choosing direct-to-consumer orthodontic care stating that this group of individuals were unlikely to pursue traditional orthodontic care anyway[27]. We see few differences between working orthodontists and residents when it comes to job satisfaction. Working orthodontists report greatest satisfaction from delivery of successful patient care seen through treatment results. After treatment results, they report nearly equal satisfaction from establishment of work-life balance and financial success. Residents, who were asked to anticipate what will contribute to job satisfaction, reported work-life balance followed closely by financial success and patient care. From this we see that priorities of residents have not changed significantly from those of working orthodontists and prioritizing work-life balance is a reality of those entering the profession. Residents should note that working orthodontists report highest stress levels stemming from staff relationship issues followed by overall practice business management. With more residents pursing employment opportunities after residency combined

with higher percentages of residents willing to enter into partnership opportunities, solo private practicing orthodontists may consider the advantage of hiring an associate with intentions of partnership to alleviate the stresses related to ownership of a small business.

Our sample included 25 orthodontists in North Carolina, Pennsylvania and Massachusetts affiliated with University of North Carolina, University of Pennsylvania or Harvard School of Dental Medicine. The perspective of orthodontists in other geographic areas were not represented, and orthodontists affiliated with these universities may not be entirely representative of debt burdens of orthodontic residents at large. For example, in state residency prices along with opportunities for teaching stipends may have contributed to the lower debt average than what is reported nationwide. In addition, our sample number was biased toward residents and early career orthodontists due to availability of individuals for interview. This may have exaggerated the number of individuals currently working in employment positions. In addition, with the majority of early career orthodontists within their first 1-3 years of practice this may have also contributed to a lower average number of job transitions.

Qualitative interviewing is an exploratory research method that does not produce quantitative statistical data. This methodology provides nuanced insight into people's experiences and opinions, therefore making it a useful psychologic and market research tool. The results of this qualitative study became the basis for the nationwide survey that quantitatively assessed career decision making, pairing the strengths of qualitative analysis (depth of information) with quantitative techniques (statistical generalizability). Our qualitative data identified relevant variables that were included in our quantitative survey.

Limitations of our study include recall bias and self-reports. Recall bias was prevalent in both the qualitative and quantitative portions of this study. During interviews, we asked interviewees from the early and mid-career orthodontist categories to recall a variety of related topics linked to their initial career as an orthodontist. We asked them to recall initial employment, initial income, debt at the time of graduation along with factors that were important to them at the time. Similarly, we requested that working orthodontists recall many of the same topics through our series of survey questions for quantitative data collection. Recall bias is prevalent in our study as comparisons were made with the orthodontic resident group. Self-reporting was also a limitation of our survey. We relied on both orthodontic residents and working orthodontists to self-report during both the interview and survey portions of our study. We are relying on accuracy of their self-reports when tabulating and conveying study conclusions. Lastly, survey response was an additional study limitation. We anticipated our survey response to be between 7-11% based on other studies conducted with dental healthcare professionals[28,29]. We believe distribution of a survey incentive to both populations was beneficial as our response rate was above 10% for both resident and working populations. One reason to explain why our survey rate is not higher might be email address contacts that are no longer active. Since the AAOF Partners in Research program distributed the survey, it is also possible that some respondents opted out from receiving email notifications and therefore did not receive the survey. It is also possible that emails were routed to individuals spam or junk and were never seen due to the electronic nature of the survey distribution. In addition, the length and complexity of our survey is likely a strong deterrent.

Despite these limitations, our survey reveals important insight into the decision processes of graduating residents today and how that has changed from generations. Our data dispels the myth that an increase in females correlates to the decrease in ownership. Instead, we know student debt levels, which are likely to continue rising, are strongly influencing the decisions of graduating residents. In addition, the onset of corporate dentistry is not only influencing graduating residents by providing them with lucrative starting positions, but it is also targeting selling doctors reducing the availability of ownership opportunities to graduating orthodontists; directly lending to a change in the landscape of our profession.

Conclusions

Semi-structured qualitative interviews supported by national AAO membership survey data of graduating orthodontic residents and working orthodontists demonstrates:

1. Graduating orthodontic residents are choosing employment over ownership as their initial career decision. Orthodontic residents maintain long-term ownership goals.
2. Importance of patient care, necessity for adequate income, and desire for work-life balance are the most important factors for residents when choosing initial employment, regardless of gender. Working orthodontists highlight patient care, work-life balance, and ownership as most important considerations when making a job transition.
3. High student debt and decreased ownership opportunities have led to higher percentages of orthodontic residents pursuing employment opportunities after graduation. The majority of residents report their student debt responsibilities are very or extremely stressful. More than half of residents think about debt most to all of the time. The majority of working orthodontists no longer think about their student debt.

4. Work-life balance is important to both residents and working orthodontists. The desire to spend more quality time with family and friends, despite the cost of income, is contributed to increased job satisfaction later in one's career.

APPENDIX 1: TOPIC GUIDE

Career Choice

- How did you decide to become a dentist?
- What attracted you to the profession?
    - Prompts: Quality of life, lifestyle, flexibility, income, autonomy/sole ownership, job security, intellectually stimulating, manual dexterity, impact factor/changing lives
- Which dental school did you attend and how did you decide to go there?
    - Prompts: Geography, tuition, family/alumni status, prestige, specialty placement success
- Why did you decide to become an orthodontist?
- What attracted you to the specialty?
    - Prompts: Quality of life, lifestyle, flexibility, income, autonomy/sole ownership, job security, intellectually stimulating, manual dexterity, impact factor/changing lives
- When you first entered residency, what did you envision yourself doing after graduation?
    - How important was autonomy to you at this point?
    - How important were family considerations or work-life balance to you? How important was income?
    - Did that change during residency? *Can you tell me more about that?*
- Can you walk me through how you found your first job(s)?
    - Did you explore multiple modes of practice type?
    - Prompts: associateship positions, associate to buy-in (partnership potential), buy-in or buy-out options, multi-specialty, ortho-only, ortho-pedo, DSO/corporate or private
- What kinds of conversations did you have with co-residents? What about faculty?
- What kinds of conversations did you have with potential employers?
- What was going through your mind when deciding on a job? What were the most important factors or considerations?
        - Prompts: Geography, spouse considerations, loan repayment options, mentorship potential, ownership, buy-out potential, income security
- How did you find the practice that you bought out/bought into? / How did you find the associateship where you worked?
    - Prompts: Residency network, AAO, recruiting services, self-directed / reaching out to dentists in the community, family owned practice
- Did this experience change your goals? How easy or challenging was this process? Can you tell me more about that? Did any deal fall through? Did you walk away from any deals or offers and why?
    - Prompts: Length of time, opportunities, geography
- You are planning to work as an ___ (associate, buy-in partner, buy-out orthodontist) after residency.
    - Could you please describe your transition into that/those position(s)? What if anything did you especially like? What if anything proved challenging?
- How important is professional autonomy to you? (how important is family care / work-life / income balance to you?
    - Prompts: Can you tell me more about that? Is this something you hope to achieve professionally?

- Where would do you see yourself professionally in 5 years? In ten years?
- Knowing what you know now, is there anything you would advise a graduating orthodontic resident on practice opportunities?

Marital Status

**Only ask if participant answered YES to marriage/children questions on demographics survey*

- How, if at all, did getting married influence your choice of practice?
- Whose career, if either, is prioritized? Can you tell me more about this?
    - Prompts: Gender, age, education, parenting, % of household income
- Can you walk me through the last conversation you had with your spouse about career decisions?

Children/Family Members

- How did having children influence your choice of practice?
    - Prompts: Number, timing (Before, during, after residency?), age factors, children with special needs/medical illness, financial responsibilities
- Do you use daycare or hired help to assist with childcare?
- Do you have family or friends that help with childcare?
- How did your family member's aging, if any, influence your choice of practice?
- How did your family member's illness, if any, influence your choice of practice?
- How did your family member's special needs, if any, influence your choice of practice?
    - Prompts: Parents, in-laws, financial burden

Debt Questions

- Thank you for answering the survey questions related to your current and former debt. How has debt influenced your practice choices? *[Do you mind sharing how much debt you have now? Would you mind sharing how much you have when you graduated residency?]*
    - Prompts: College debt, dental school debt, residency debt, career choice, family financial situation
- Can you tell me about any additional debt you may have since graduating?
    - Prompts: Credit card, additional tuition, buying a practice, family member support, cost of living, buying a car

I am going to switch gears a bit and ask you about larger lifestyle issues

- How, if at all, has debt influenced your lifestyle decisions?
    - Prompts: Buying a house, buying a car, getting married, buying a practice, sending children to school, supporting family members
- In what other ways has debt had an impact on you (and your family)?

Job Satisfaction

- What contributes to your job satisfaction?
    - Prompts: Delivery of care, practice management, personal time, professional time, patient relations, income, staff relations, stress, professional environment
- What contributes **most** to your job satisfaction if you had to choose?
- Tell me about how you manage the business aspect of your work?
    - Prompts: Practice management training, residency preparation, role of mentorship

- Do you anticipate you will solely manage the business aspects of your office? How do you feel about that?
    - Prompts: Level of involvement, hiring, stress
- Can you talk to me about your work-life balance?
    - How do you find your personal life, leisure activities and your family aligning with your professional responsibilities?
    - Prompts: Personal time, leisure activities, professional responsibilities, family, stress, sleep
- How has orthodontics fulfilled your earliest career aspirations?
- How does orthodontics fulfill your current career aspirations?
- If your children were interested in dentistry / orthodontics would you encourage him/her to pursue that interest? Can you elaborate?
    - Prompts: Familial connections, fulfilling career, income security, job security, expensive education, years of education
- If you had to do it all over again, would you make the same decision to go into dentistry again?
    - Prompts: Familial connections, fulfilling career, income security, job security, expensive education, years of education, income, flexibility, trapped, contributions, make a change
- What contributes to your stress in your profession?
    - Prompts: Social Media, IT, technology adaptation, practice management, malpractice, competitiveness
- In your opinion, do you feel that orthodontics is a stressful profession? Can you tell me more about that?
    - Prompts: educational journey, debt burden, clinical practice, business management, healthcare
- What was the last stressful incident you had at work?

Income

- Do you consider your anticipated income to be too low? Too high? Can you tell me more about this?
    - Prompts: Colleagues/competitors in the area, debt load, additional loan c considerations (car, home, etc)
- How do you consider your income level compared with other orthodontists in your town/city?
    - Prompts: Too high, too low, comparable
- How do you feel your income meets your [your family's] needs?
    - Prompts: Primary earner, secondary earner, budget, stress
- Under what circumstances would you be willing to accept reduced income?
- Are you willing to accept reduced income to achieve professional autonomy?
    - Prompts: Initial/temporary
- Is there anything you would like to touch on that I haven't already asked?

APPENDIX 2: CODEBOOK

Code	*Notes / Description*
Job Options	
Ownership (Solo/Partnership)	Orthodontist owned
Private Practice (Ortho)	Orthodontic only
Academic/Organized Dentistry	Non-private practice
Mega Practice (DSO, Multi)	Corporate or DSO owned entity
Associateship (includes independent contractor)	Employment with orthodontist owned or corporate entity
Multi-specialty/Group Practice	Orthodontics combined with other specialty
Job Decision Factors	
Autonomy/Small Business Owner	Desire to make business and treatment decisions
Geography/Commute	In relation to office and home commute
Timing/fit	Timing or fit of finding job opportunity
Income/Job Security	Impact of income and job security on decision
Work Life Balance/Flexibility/Travel	Importance when choosing career
Mentorship Exposure	Necessity for mentorship when choosing career
Family Influences	
Spouse/Significant Other	Influence of spouse, partner, etc on career decision
Marriage	Influence of marriage on career decision
Parents/Extended Family	Influence of extended family on career decision
Children	Influence of children on career decision
Gender Role	Influence of perceived gender responsibility on career decision
Job Satisfaction/Stress	
Delivery of Care/Patient Volume	Influence on job satisfaction or stress

Employer/Partner Relationship	Influence on job satisfaction or stress
Personal/Lifestyle Spending	Influence on job satisfaction or stress
Technology/Social Media Demands	Influence on job satisfaction or stress
Staff relationships/Impact Factor	Influence on job satisfaction or stress
Patient relationships/Impact Factor	Influence on job satisfaction or stress
Competition/Marketing/Networking	Influence on job satisfaction or stress
Shared Responsibilities	Influence on job satisfaction or stress
Business/Practice Management	Influence on job satisfaction or stress
Educational Debt	Influence on job satisfaction or stress
Miscellaneous	
(+) Positive/Incentive/Satisfaction/Easy	Used to code positive interviewee viewpoint
(-) Negative/Risk/Stress/Challenge/Ethics	Used to code negative interviewee viewpoint
Neutral/Frugal/Savings	Used to code neutral interviewee viewpoint
Reduced	Used for coding the reduction or lessening of
Data Categories	
First Job Decision Process	Coded when discussing first job decision
Job Transition Decision Process	Coded when discussing job transition decision
Factors Influencing Job Satisfaction/Stress	Coded when discussing job stress/satisfaction
Influence of Lifestyle Decision Process	Coded when discussing influence of lifestyle
Influence of Debt on Decision Making	Coded when discussing influence of debt
Influence of Income on Decision Process	Coded when discussing influence of income

APPENDIX 3: SURVEY REFERENCE GUIDE

Questions / Hypothesis to be tested	**Resident** Survey	**Working** Survey	Qualitative study finding
Demographics: *Residents:* Are they in their final year or not. *Working Orthodontists:* How many years has it been since graduating residency? Demographics include… Residency year or residency graduation year? Ortho residency program? Age? Gender? Ethnicity? Marital Status? # Children? Caregiver? Household income? Employement? Location (city or state)? Hours working?	Q2: Final year of residency? Q3: Ortho Residency Program Q4: Age Q5: Gender Q6: Ethnicity Q7-8: Marital Status Q9-10: # Children <18 yo Q11: Primary Caregiver for kids Q12: % contribution to household income Q14: Expected Initial Employment *[select all]* Q15: City or State planning to practice Q17: How many days do you expect to work per week	Q2: Residency graduation year Q3: Ortho Residency Program Q4: Age Q5: Gender Q6: Ethnicity Q7-8: Marital Status Q9-10: # Children <18 yo Q11: Primary Caregiver for kids Q12: % contribution to household income Q28: Initial Employment post-residency *[select all]* Q31: City or State practicing initially Q17: How many days do you work per week	Qualitative data shows that current residents are younger, males and females are equally representative, and this population expects to work in urban/suburban geographic locations that are saturated and highly sought after. The resident population is more likely to have females as primary earners or at least equal earners. This population is more likely than the working to have two working individuals and more likely to rely on daycare services for childcare. Residents are burdened with higher debt load an may expect initial salary to be larger than working orthodontists expected in the past. Resident orthodontist are likely to have higher debt loads than working orthodontists once had. Early career working orthodontists are expected to have had more job changes than mid-career orthodontists who may have move from an associate role immediately

	Q29: How much total educational debt will you have when graduating residency	Q18: How many hours per week do you work distributed among 4 categories Q14: Current Employment Q15: City or State practicing currently Q29: Is your current employment the same as your initial employment Q47: How much debt did you have when initially graduating from residency? Q48: How much debt do you currently have? Q62: At what age do you plan to retire	into ownership following a short initial transition. Working orthodontists are more likely to currently be in ownership roles and are more likely to have pursued initial ownership roles than current resident preparing to enter the workforce.
Career Choice *Residents:* What factors are important when choosing your initial career. *Orthodontists:* What factors are important when you chose your initial employment and what	Q14: Factors important in choosing initial career *[rank, 1=most important, 6=least important]*	Q30: Factors important in choosing initial career *[rank, 1=most important, 6=least important]* Q14: Factors important in	Factors important to residents include income, geography and work life balance. Factors important to working orthodontists include ownership, autonomy and work life balance.

factors were most important when you made a career transition?		choosing current employment *[rank, 1=most important, 6=least important]*	
Income	Q16: How much to you expect to earn annually (pre-tax) *[drop-down]*	Q32: How much were you earning annually initially? *[drop-down]* Q16: How much do you currently earn annually (pre-tax) *[drop-down]*	Residents expect to earn income that will meet their needs especially with high student debt burdens. Working orthodontists likely expected less initial income due to less student debt and were willing to prioritize ownership. Working orthodontists are likely earning more if they are in ownership situations than those who chose to stay in employment roles.
Work Life Balance	Q43: How important is work-life balance to you? Q44: How would you rate your current work-life balance? *[0 (poor) – 10 (excellent)]*	Q64: How important is work-life balance to you? Q65: How would you rate your current work-life balance? *[0 (poor) – 10 (excellent)]*	Work life balance is going to be important to residents due to their millennial status. Working orthodontists later in their career may prioritize ownership so they can pursue time with family/friends. Those in employment situations likely have better work life balance than those in ownership roles.
Practice Modalities and Transition(s)	Q18: Will you consider working multiple associateships	Q34: Did you work multiple associateships initially Q35: How many years did you work multiple associateships	Residents are more willing to consider initial employment as private practice associates or corporate/DSO associates. Residents are more likely to work in multiple employment roles to begin their careers. Working orthodontists were less likely to pursue

		Q41: How many orthodontic jobs have you had since graduating residency Q42: What motivated your job transition(s)? *[select 2, equal importance]*	corporate/DSO options and likely didn't pursue multiple initial careers.
Ownership	Q19: Do you have a defined buy-in or buy-out agreement Q20: Do you feel prepared to buy-out or buy-into a practice following residency? Q21: Do you feel prepared to start a practice immediately following residency? Q22: Why do you feel unprepared for practice ownership following residency Q23: Why do you feel unprepared to start a practice immediately following residency Q24: Are you planning to pursue	Q33: Did you have a defined buy-in or buy-out agreement Q36: Did you feel prepared to buy-out or buy-into a practice following residency? Q37: Do you feel prepared to start a practice immediately following residency? Q38: Why do you feel unprepared for practice ownership following residency Q39: Why do you feel unprepared to start a practice immediately following residency Q22: Are you planning to	Residents are less likely to have defined buy-in agreements and are less likely to feel ready to start/buy-in/buy-out a practice. Residents are likely to still have long-term goals of ownership in the field. Working orthodontists were more likely to have defined buy-in/out agreements and were likely more willing to start their own practice and to prioritize ownership.

	ownership in the next 2 years Q25: Why are you planning to pursue ownership in 2 years? *[rank, 1= highest, 4 = lowest]* Q26: Are you planning to pursue ownership in 10 years? Q27: Why are you planning to pursue ownership in next 10 years? *[rank, 1= highest, 4 = lowest]* Q28: Why are you not planning to pursue ownership? *[select 2, equal importance]*	pursue ownership in the next 2 years Q23: Why are you planning to pursue ownership in 2 years? *[rank, 1= highest, 4 = lowest]* Q24: Are you planning to pursue ownership in 10 years? Q25: Why are you planning to pursue ownership in next 10 years? *[rank, 1= highest, 4 = lowest]* Q26: Why are you not planning to pursue ownership? *[select 2, equal importance]* Q27: How many years did it take you to obtain ownership?	
Impact of Educational Debt	Q30: How often do you think about educational debt Q31: How stressful is your educational debt?	Q49: How often do you think about educational debt Q50: How stressful is your educational debt?	Residents are more likely to be stressed out over high student debt loads.
Career Goals: *Interested in short-term (5 year) and long-*	Q32: In 5 years what will be most important to you?	Q45: In 5 years what will be most important to you?	Residents are likely to have long-term goals of ownership, however, may

term (10 year) career goals	Q33: In 10 years what will be most important to you? Q37: Why did you choose to enter the field? *[select 2, equal importance]* Q46: What is most important to you with regard to career goals at this time? *[select 2, equal importance]* Q47: What describes your ultimate employment goal? *[select all]*	Q46: In 15 years what will be most important to you? Q57: Why did you choose to enter the field? *[select 2, equal importance]* Q44: What is most important to you with regard to career goals at this time? *[select 2, equal importance]* Q43: What describes your ultimate employment goal? *[select all]* Q67: Where do you see yourself professionally in 5 years? *[select all]* Q68: Where do you see yourself professionally in 15 years? *[select all]*	prioritize partnerships over sole ownership for work life balance/flexibility.

Corporate/DSO	Q34: Are you willing to work for corporate or DSO? Q35: What is most important to you when considering Corporate/DSO *[select 2, equal importance]* Q36: What is greatest reservation when considering Corporate/DSO *[select 2, equal importance]*	Q52: Are you willing to work for or transition your practice to a corporate or DSO? Q53: What is most important to you when considering Corporate/DSO *[select 2, equal importance]* Q54: What is greatest reservation when considering Corporate/DSO *[select 2, equal importance]* Q55: Will you consider selling your practice to corporate or DSO? Q56: Why will you consider selling to corporate or DSO?	Residents and younger working orthodontists will be more likely and willing to consider employment with corporate/DSO. Reservations for both groups may be similar and to include lack of decision making with regard to practice management and treatment protocols. In addition, lack of ethical treatment of patients.
Job Satisfaction	Q38: How satisfied are you with decision to enter the field? Q39: Would you encourage child or close family member to enter the field of orthodontics?	Q58: How satisfied are you with decision to enter the field? Q59: Would you encourage child or close family member to enter the field of orthodontics?	Residents will have less overall job satisfaction compared with working orthodontists due to many years of educational requirements with large tuition rates as delayed initial earnings compared with their predecessors. Residents are more likely

	Q40: If you were to start over today would you choose to enter the field Q41: What concerns do have regarding the field of orthodontics? *[select 2, equal importance]* Q42: What do you anticipate will contribute most to stress in your job? *[select 2, equal importance]* Q45: What do you think will contribute most to job satisfaction? *[select 2, equal importance]*	Q60: If you were to start over today would you choose to enter the field Q61: What concerns do have regarding the field of orthodontics? *[select 2, equal importance]* Q63: What contributes most to stress in your job? *[select 2, equal importance]* Q66: What contributes most to your job satisfaction? *[select 2, equal importance]* Q40: Reflect on how stressful employment was associate or IC was? Q51: Does your practice delegate business management responsibilities?	to experience stress related to debt and need for higher income as well as patient volume. Working orthodontists are likely to find stress through staff management and practice management responsibilities. Working orthodontists are likely to relate business/practice management with high stress. Job satisfaction for both is likely to come from good overall treatment of patients and treatment results.

REFERENCES

1. *American Association of Orthodontists 2017 Orthodontic Workforce Report*.; 2018.

2. Waldman HB, Perlman SP, Schindel R. Update on the imbalanced distribution of orthodontists, 1995-2006. *Am J Orthod Dentofac Orthop*. 2009;135(6):704-708. doi:10.1016/j.ajodo.2009.01.004

3. Keim RG, Vogels DS, Vogels PB. 2015 JCO Orthodontic Practice Study Part 3: Practice Growth and Staff Data. *J Clin Orthod*. 2015;53(12):713-725.

4. Roberts CA. The case for dental support organizations. *Am J Orthod Dentofac Orthop*. 2017;151(2):245-247. doi:10.1016/j.ajodo.2016.11.018

5. Vujicic M, Israelson H, Antoon J, Kiesling R, Paumier T, Zust M. Guest editorial: A profession in transition. *J Am Dent Assoc*. 2014;145(2):118-121. doi:10.14219/jada.2013.40

6. Associates BC&. *2018 Annual Orthodontic Resident Survey*.; 2018.

7. Davidson S, Flores-Mir C, Keenan L. Women in orthodontics and work-family balance: challenges and strategies. *J Can Dent Assoc*. 2012;78(c61):1-6.

8. Lindauer SJ, Peck SL, Tufekci E, Coffey T, Best AM, Richmond E. The crisis in orthodontic education: Goals and perceptions. 2003. doi:10.1067/j.ajodo.2003.08.007

9. Anning RJ, Thomson WM, Quick AN. Orthodontic education programs: An international comparison of students' views and experiences. *Am J Orthod Dentofac Orthop*. 2011;139(2):220-227. doi:10.1016/j.ajodo.2010.01.032

10. Bruner MK, Hilgers KK, Silveira AM, Butters JM. Graduate orthodontic education: The residents' perspective. *Am J Orthod Dentofac Orthop*. 2005;128(3):277-282. doi:10.1016/j.ajodo.2005.04.031

11. Noble J, Hechter FJ, Karaiskos NE, Lekic N, Wiltshire WA. Future practice plans of orthodontic residents in the United States. *Am J Orthod Dentofac Orthop*. 2009;135(3):357-360. doi:10.1016/j.ajodo.2008.09.024

12. Keim R. The Burden of Student Debt. *J Clin Orthod*. 2016;L(1):9-10. www.jco-online.com.

13. Pruzansky DP, Ellis B, Park JH. *MANAGEMENT & MARKETING Influence of Student-Loan Debt on Orthodontic Residents and Recent Graduates*.

14. *AAO White Paper: You Have Options - Orthodontic Career Considerations for Residents and Graduates*.; 2017.

15. Shugars DA, Hays RD, Dimatteo MR, Cretin S. *Development of an Instrument to Measure Job Satisfaction among Dentists*. Vol 29.; 1991.

16. Roth SF, Heo G, Varnhagen C, Glover KE, Major PW. Job satisfaction among Canadian orthodontists. *Am J Orthod Dentofac Orthop*. 2003;123(6):695-700. doi:10.1016/S0889-5406(03)00200-2

17. Matthews DC, McNeil K, Brillant M, et al. Factors influencing adoption of new technologies into dental practice: A qualitative study. *JDR Clin Transl Res*. 2016;1(1):77-85. doi:10.1177/2380084415627129

18. Rubin H, Rubin I. *Qualitative Interviewing: The Art of Hearing Data*. 3rd ed. Thousand Oaks, California: SAGE; 2012.

19. Jacox LA, Mihas P, Cho C, Lin FC, Ko CC. Understanding technology adoption by orthodontists: A qualitative study. *Am J Orthod Dentofac Orthop*. 2019;155(3):432-442. doi:10.1016/j.ajodo.2018.08.018

20. Carter N, Bryant-Lukosius D, Dicenso A, Blythe J, Neville AJ. The use of triangulation in qualitative research. *Oncol Nurs Forum*. 2014;41(5):545-547. doi:10.1188/14.ONF.545-547

21. Saldana J. *The Coding Manual for Qualitative Researchers*. 3E Third e. Los Angeles: SAGE; 2016.

22. Silver C. *Using Software in Qualitative Research: A Step-by-Step Guide*. 2nd editio. Thousand Oaks, California: SAGE Publications Ltd; 2014.

23. *2017 JCO Orthodontic Practice Study Part 1 Trends*.; 2017. www.jco-online.com.

24. Burke JR, Onwuegbuzie A. Mixed Methods Research: A Research Paradigm Whose Time Has Come. http://mintlinz.pbworks.com/w/file/fetch/%0A83256376/Johnson Mixed methods 2004.pdf. Published 2004. Accessed March 15, 2020.

25. Kay K, Shipman C. The Confidence Gap. 2014:1-25.

26. Sarsons H, Xu G. Confidence men? Gender and confidence: Evidence among top economists. *Unpubl Manuscr*. 2015:1-26. http://www.guoxu.org/docs/confidence.pdf.

27. Olson JC. Comparison of Patient Factors Influencing the Selection of an Orthodontist , General Dentist , or Direct-To-Consumer Aligners for Orthodontic Treatment. 2019:1-51.

28. Hyun Park JA. *Trends in the Use of Digital Study Models and Other Technologies Among Practicing Orthodontists*.; 2016.

29. Uribe F, Padala S, Allareddy V, Nanda R. Patients', parents', and orthodontists' perceptions of the need for and costs of additional procedures to reduce treatment time. *Am J Orthod Dentofac Orthop*. 2014;145:S65-S73. doi:10.1016/j.ajodo.2013.12.015